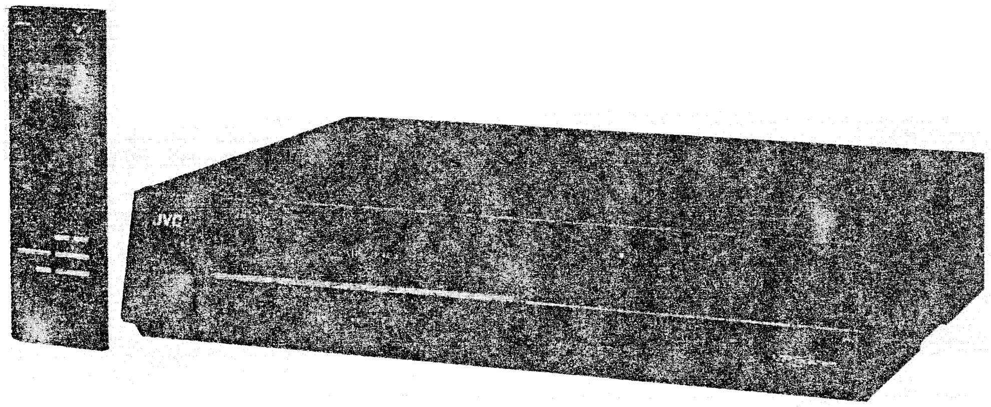
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER VHS PAL

HR-D320E/EG



HQ

VPSystem VIDEO PROGRAM

INDEX VHS-INDEX-SUCHLAUF

HYPERBAND OST EMPFANG

SPECIFICATIONS

Format	VHS PAL standard
Recording system	Rotary, slant azimuth two-head helical scan system
Video signal system	PAL colour and CCIR monochrome signals, 625 lines
Tape width	12.65 mm
Playing time	240 min. with E-240 video cassette
Temperature	
Operating	5°C to 40°C
Storage	-20°C to 60°C
Channel coverage	VHF 47 – 89 MHz, 104 – 300 MHz, 302 – 470 MHz UHF 470 – 862 MHz
Aerial output	UHF channels 32 – 40 (adjustable)
Power consumption	28 watts
Power requirement	220 V∿, 50/60 Hz
Video	
Input	0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	43 dB (Rohde & Schwarz noise meter)
Horizontal resolution	250 lines
Audio	
Input	-3.8 dBs (CENELEC standard), more than 50 k-ohms, unbalanced
Output level	-3.8 dBs (CENELEC standard), high impedance load
Output impedance	Less than 1 k-ohm, unbalanced
Signal-to-noise ratio	More than 40 dB
Frequency range	70 Hz to 10,000 Hz
Timer	14-day/4-programme timer
Dimensions	435 mm(W) x 95 mm(H) x 341 mm(D)
Weight	6.5 kg
Provided accessories	Aerial cable, Infrared remote control unit, "R6" battery x 2

Design and specifications subject to change without notice.

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No. 82046
March 1988

NOTE: For a technical description, please refer to Technical Guide VTG82021 HR-D400/320 PAL.

TABLE OF CONTENTS

Section Title Page

Important Safety Precautions

INSTRUCTIONS

1. MECHANISM ADJUSTMENT

1.1 GENERAL 1-1
1.2 MAIN ASSEMBLY REPLACEMENT 1-4
1.3 ASSEMBLY PROCEDURE OF MECHANISM 1-5
1.4 CONFIRMATION AND ADJUSTMENT 1-7
1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT 1-7
1.6 INTERCHANGEABILITY CONFIRMATION AND ADJUSTMENT 1-8

2. ELECTRICAL ADJUSTMENTS

2.1 PREPARATION 2-1
2.2 SERVO CIRCUIT 2-3
2.3 VIDEO CIRCUIT 2-3
2.4 AUDIO CIRCUIT 2-4
2.5 TUNER/IF CIRCUIT 2-5

3. CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD LOCATIONS 3-1
3.2 GENERAL INFORMATIONS 3-2
3.3 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAM 3-3
3.4 MAIN TYPES OF ACTIVE AND PACKAGE CIRCUITS 3-5
3.5 BOARD INTERCONNECTION DIAGRAM 3-6
3.6 IF AND TUNER CTL BLOCK DIAGRAMS 3-7
3.7 VIDEO BLOCK DIAGRAM 3-8
3.8 SERVO BLOCK DIAGRAM 3-9
3.9 AUDIO BLOCK DIAGRAM 3-10
3.10 MECHANISM CONTROL AND TIMER/DISPLAY BLOCK DIAGRAMS 3-10
3.11 POWER TRANSFORMER AND REGULATOR SCHEMATIC DIAGRAMS 3-12
3.12 POWER TRANSFORMER CIRCUIT BOARD 3-13
3.13 AUDIO SCHEMATIC DIAGRAM 3-14
3.14 SERVO SCHEMATIC DIAGRAM 3-15
3.15 MECHANISM CONTROL SCHEMATIC DIAGRAM 3-16
3.16 DECK TERMINAL SCHEMATIC DIAGRAMS 3-17
3.17 DECK TERMINAL CIRCUIT BOARDS 3-17
3.18 VIDEO SCHEMATIC DIAGRAM 3-18
3.19 MAIN AND SECAM DETECTOR CIRCUIT BOARDS 3-19
3.20 PRE/REC SCHEMATIC DIAGRAM 3-20
3.21 PRE/REC AND UPPER DRUM CIRCUIT BOARDS 3-21
3.22 IF SCHEMATIC DIAGRAM 3-22
3.23 IF CIRCUIT BOARD 3-23
3.24 TUNER CTL SCHEMATIC DIAGRAM 3-24
3.25 TUNER CTL CIRCUIT BOARD 3-25
3.26 TIMER/DISPLAY AND MEMORY SCHEMATIC DIAGRAMS 3-26
3.27 TIMER/DISPLAY, VPS, OPERATION AND MEMORY CIRCUIT BOARDS 3-27
3.28 OPERATION AND VPS SCHEMATIC DIAGRAMS 3-28
3.29 RF CONVERTOR AND MIX BOOSTER SCHEMATIC DIAGRAM 3-29
3.30 REMOTE CONTROL SCHEMATIC DIAGRAM 3-30

Section Title Page

4. EXPLODED VIEWS AND PARTS LIST

4.1 STANDARD PART NUMBER CODING 4-1
4.2 CABINET ASSEMBLY <M2> 4-2
4.3 CHASSIS ASSEMBLY <M3> 4-3
4.4 MECHANISM ASSEMBLY <M4> 4-4
4.5 PACKING ASSEMBLY <M1> 4-6

5. ELECTRICAL PARTS LIST

5.1 STANDARD PARTS NUMBER CODING 5-2
POWER TRANSFORMER BOARD ASSEMBLY <01> 5-6
MAIN BOARD ASSEMBLY <03> 5-6
IF BOARD ASSEMBLY <07> 5-11
TUNER CONTROL BOARD ASSEMBLY <08> 5-12
AUDIO CONTROL HEAD BOARD <12> 5-13
VPS BOARD ASSEMBLY <18> 5-13
TIMER/DISPLAY BOARD ASSEMBLY <21> 5-14
OPERATION BOARD ASSEMBLY <22> 5-15
MEMORY BOARD ASSEMBLY <35> 5-15
UPPER DRUM BOARD <41> 5-15
PRE/REC BOARD ASSEMBLY <43> 5-15
SECAM DETECTOR BOARD ASSEMBLY <44> 5-16
DECK TERMINAL BOARD ASSEMBLY <51><53> 5-16
RELAY BOARD ASSEMBLY <52> 5-17
END SENSOR BOARD ASSEMBLY <54> 5-17
CASSETTE HOUSING BOARD <56> 5-17

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

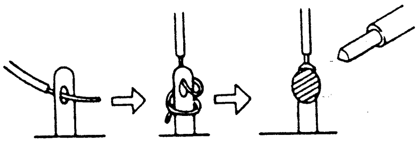


Fig. 1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

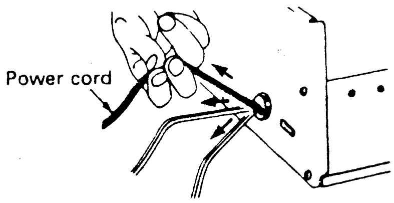


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. **Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.**

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number :** E03830-001
    2) **Required tool :** Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

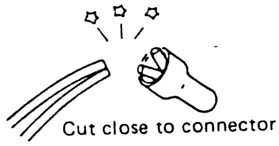


Fig. 3

       (2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

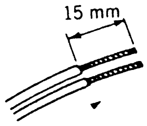


Fig. 4

       (3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

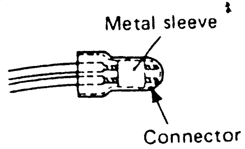


Fig. 5

       (4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

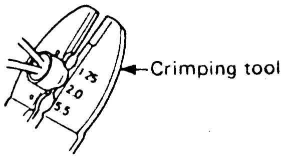


Fig. 6

       (5) Check the four points noted in Fig. 7.

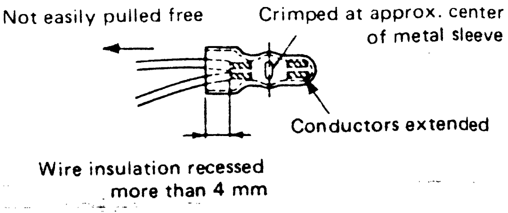

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

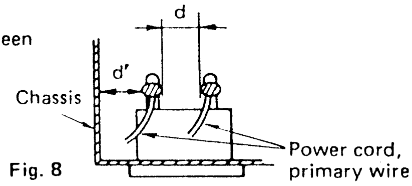


Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
   Measuring Method: (Power ON)
   Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

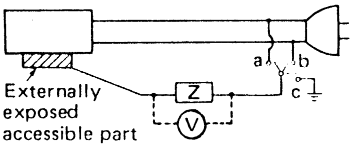


Fig. 9

5. **Grounding (Class I model only)**
   Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
   Measuring Method:
   Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

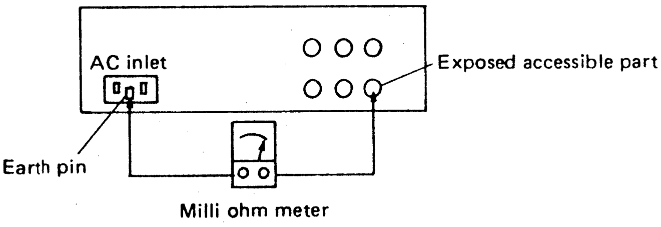


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

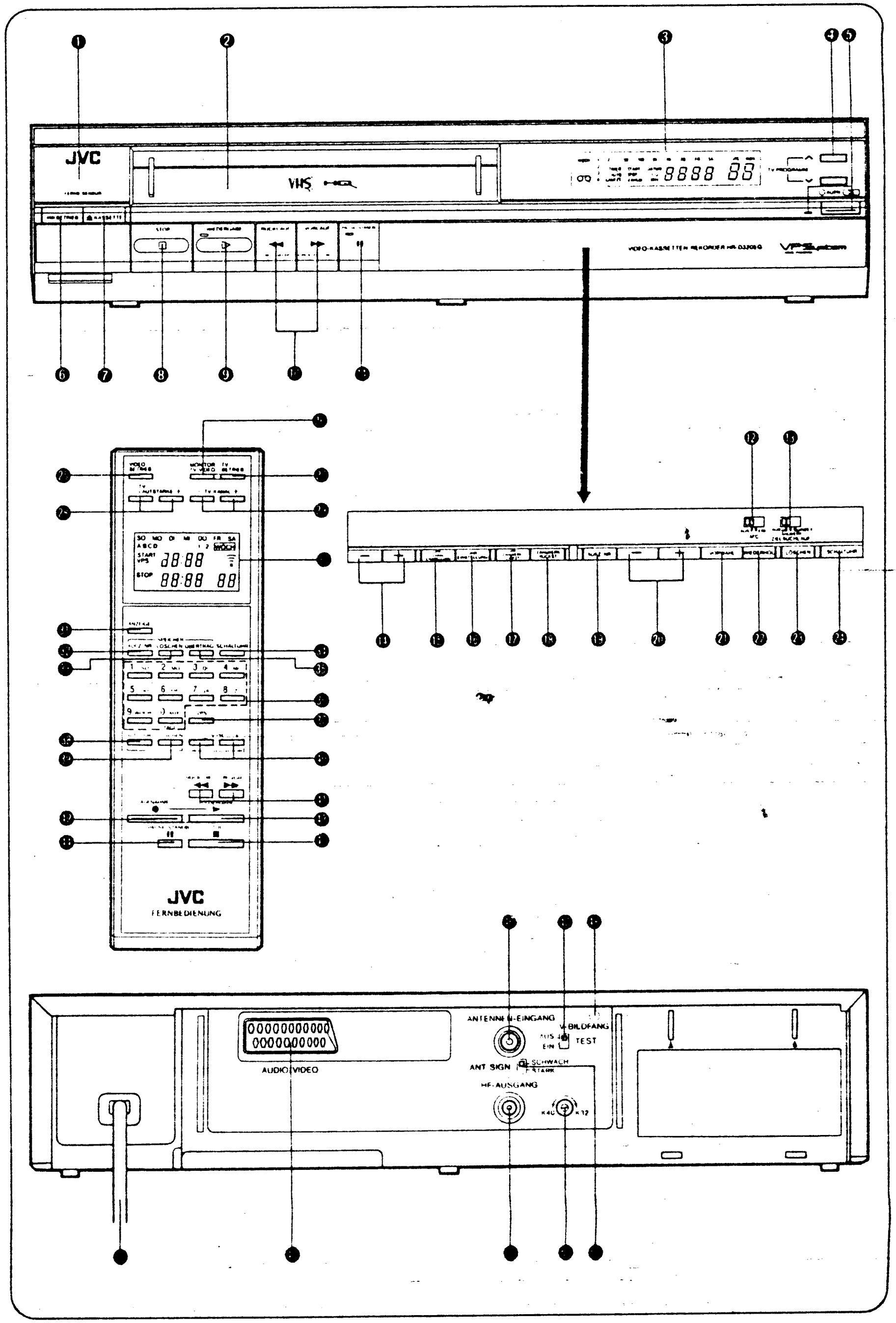
AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

Thank you for purchasing the JVC HR-D320EG Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.
Diagrams are on the reverse side of this page. Fold it out and keep it opened so that you can refer to the diagrams when you are reading this booklet.

ENGLISH INSTRUCTIONS .... Page 17 – 32


JVC
VHS HQ
JVC
FERNBEDIENUNG
ANTENNEN-EINGANG
BILDFANG
AUS
EIN
TEST
ANT SIGN
SCHWACH
STARK
HF-AUSGANG
K40
K12
AUDIO/VIDEO

CONTENTS

Features 18
Precautions 19
Controls, indicators and connectors 20
Connections 22
Video channel setting 22
Clock setting 23
Loading and unloading a cassette 23
Operating the built-in tuner 24
Playing back a video cassette 25
Recording TV programmes 26
Index search and counter search 27
Elapsed recording time indicator 27
Next-function memory 27
Automatic timer recording 28
Important information on timer recording 30
VPS recording 30
Recording from an external source 31
In case of difficulty 31
Head cleaning 31
Specifications 32

SAFETY PRECAUTIONS

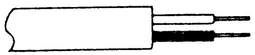
The rating plate and the safety caution are on the rear of the unit.

WARNING – DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom)
Mains Supply (240 V∿, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:



If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt – consult a competent electrician.

Note
We recommend that you should disconnect the AC cord from the outlet.

CAUTION
- Disconnect the mains plug from the supply socket when not in use.
- When you are not using the HR-D320EG for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

VHS PAL HQ

- Only cassettes marked "VHS" can be used with this video cassette recorder.
- HQ VHS is compatible with existing VHS equipment.

FOR YOUR SAFETY (in Australia)
Install any external aerial to AS 1417.1

Omkopplaren BETRIEB på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge BETRIEB OFF.

The BETRIEB button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMAERK: I stilling OFF er apparatet stadig forbundet med lysnettet Hvis det ønskes fuldstændig afbrudt skal netledningen trækkes ud.

This unit is produced to comply with Directive 82/499/EEC, CISPR Pub. 13 and Pub. 14 and Standard IEC 65.

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FEATURES

High-quality pictures
- **HQ (High Quality) System technologies** with a Detail Enhancer, and 20 % higher white clip level.

Advanced tape access features
- **VHS Index Search System** facilitates location of the beginning of each recording by automatically marking an index code on the control track of the tape; index codes can be detected in the Shuttle Search mode. This system is based on the newly standardised CTL coding system for VHS.
- Counter search for returning to a designated point on a tape.

Remote control features
- **Independent timer programming** with LCD and built-in 4-programme memory.
- **10-Key random-access channel selection** and up/down scanning.
- **TV control** for power on/off, volume, channel selection and AV mode switching (designated TV models only).

Convenient automatic functions
- **Auto play function:** insert a cassette (with safety tab removed), and playback will start automatically.
- **Next-function memory** allows a command to be entered immediately after pressing RÜCKLAUF (or VORLAUF), with the second command "remembered" and performed automatically after the tape rewinds to its beginning or fast-forwards to the counter reading of "0000".
  - Memory play: for automatic start of playback.
  - Memory eject: to eject the cassette after rewind, without waiting for completion of rewind.
  - Memory timer standby: to engage the timer recording standby mode after rewind.
  - Memory power-off: to turn the power off after rewind.
- Automatic backspace editing.
- Auto-power-on convenience.
- Power-off ejection.
- Automatic rewind at the end of tape.

Other value features
- **Voltage synthesized wide-band cable tuner** with 48-channel preset capacity; can receive VHF, UHF and cable channels including those of hyper band.
- **Compatible with VPS (Video Programme System)** with built-in VPS decoder.
- **14-Day/4-event programmable timer.**
- **Overlapped programme warning:** programme numbers on the FDP blink when the preset time spans of the programmes overlap.
- **Timer programme review** to show the preset programme contents in the order of execution.
- **Infrared remote control.**
- **On-screen record-pause mode display** with elapsed time indicated by shrinking white bar.
- Electronic tracking controls.
- Instant timer recording function using the record button.
- **Shuttle Search with latch function:** with the Shuttle Search button locked or held depressed, offers high-speed playback at 9 times normal speed in either direction.
- Still and frame advance.
- Comprehensive fluorescent display.
- Elapsed recording time indicator.

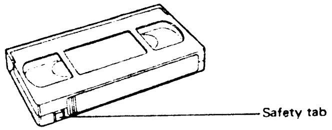
PRECAUTIONS

Handling and storage

- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation.
  Avoid using the recorder immediately after moving from a cold place to a warm place. The water vapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

- This recorder employs VHS-type cassettes only.
  E-240 for 4 hours, E-180 for 3 hours, E-120 for 2 hours, E-90 for 1 hour and 30 minutes, E-60 for 1 hour and E-30 for 30 minutes of recording.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture condensation is apt to occur under the following conditions:
  - when the recorder is moved from a cold place to a warm place, and
  - under extremely humid conditions.
- In conditions where moisture condensation may occur, keep the power cord plugged in an AC outlet and the BETRIEB switch set to ON; this would help prevent condensation from occurring. When condensation has occurred, it will not evaporate quickly once the power is switched on. Wait a few hours for the recorder to become dry.

Operation

- When a cassette is loaded, the power is switched on automatically.
- The cassette can be unloaded even when the power is off. Pressing the KASSETTE button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the SCHALTUHR button is engaged with the TIMER indicator lit, the BETRIEB and KASSETTE buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

Remote control unit

- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

WARNING

1. This recorder can also receive SECAM colour television signals for recording and playback.
2. Recordings made of SECAM television signals produce monochrome pictures if played back on another video recorder of SECAM standard, or do not produce normal colour pictures if played back on another video recorder of PAL standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.
4. This recorder cannot be used in France. Use a SECAM recorder to record French SECAM signals in France.

CONTROLS, INDICATORS AND CONNECTORS

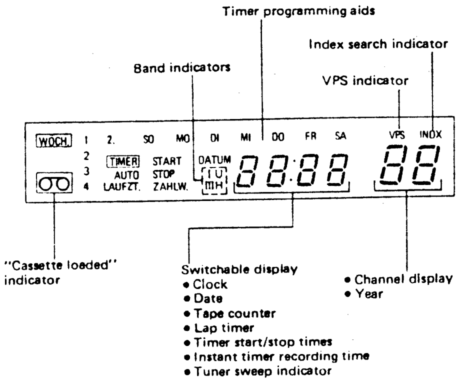
Refer to the diagrams on the front foldout page.

Front Panel

① **Infrared beam receiving window (FERNB. SENSOR)**

② **Cassette loading slot**
Insert a VHS cassette. The door will close and the "cassette loaded" indicator will appear on the FDP (fluorescent display panel).

③ **Fluorescent display panel**
Fully explained in relevant sections.



④ **TV programme -/+ buttons (TV PROGRAMM)**
Press either button to select a desired channel.

⑤ **Record/Instant timer record button (AUFN. DA) with LED indicator**
Press once to start recording. Pressing it again engages the Instant Timer Recording mode. See page 26.

⑥ **Operate button (BETRIEB) with LED indicator**
Press to apply operating power to the recorder. The indicator will light. Loading a cassette also turns the power on.

⑦ **Cassette eject button (KASSETTE)**

⑧ **STOP button**
Press to stop the tape.

⑨ **Play button (WIEDERGABE) with LED indicator**
Press to play back the tape or cancel the Pause/Still and Search modes.

⑩ **Rewind and Fast-Forward (Shuttle Search) buttons (RÜCKLAUF and VORLAUF) (BILDSUCHLAUF)**
Press while in the Stop mode to rewind or fast-forward the tape; press while in the Play mode to view the speeded-up picture for programme search. See pages 25 and 27.

⑪ **Pause/Still button (PAUSE/STANDB.) with LED indicator**
Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced step by step or continuously.

⑫ **AFC switch**
Normally set to EIN. If reception of a broadcast programme is substandard, set it to AUS.

⑬ **Tape memory switch (ZIELSUCHLAUF)**

ZÄHLWERK: The tape will stop automatically at the counter reading of about "0000" in the Rewind or Fast Forward mode. See page 27.

INDEX: The index code marked at the beginning of each recording will be detected in the Shuttle Search mode for automatic start of playback. See page 27.

AUS: Set to AUS if you are not going to use either of the two functions.

⑭ **Tracking -/+ buttons (SPURLAGE)**
Press either button to minimise noise bars, if observed, during playback.

⑮ **VPS/Channel set button (VPS/KANALEINSTELLUNG)**
A dual-function switch. Serves as a VPS command enter button in timer programming (see page 30). Normally functions to engage or disengage the tuner preset mode (see page 24).

⑯ **Clock adjust button (UHREINSTELLUNG)**
Press to adjust the clock.

⑰ **Clock/Counter/Lap button (UHR/ZÄHLWERK/LAUFZT.)**
Press to switch the display among clock, tape counter (ZÄHLW.) and lap time (LAUFZT.). Also used to change the display from the timer programming mode to the clock mode.

⑱ **Counter reset button (ZÄHLWERK-RÜCKST.)**
Press to reset the counter reading or lap time to "0000" or "0 : 00" respectively.

⑲ **Programme button (AUFZ. NR.)**
Press to programme the timer.

⑳ **Channel search/Set -/+ buttons (KANAL SUCHLAUF/ EINGABE)**
Press to search for broadcast programmes in tuner presetting; press to set to the correct data in clock setting or timer programming.

㉑ **Select button (VORWAHL)**
Press to select the band in tuner presetting; press to select the item to be set in clock setting or timer programming.

㉒ **Store/Repeat button (SPEICHERN/WIEDERHOL.)**
Press to store the tuned-in channel in tuner presetting; press to enter the repeat command in timer programming.

㉓ **Skip/Cancel button (ÜBERSPRINGEN/LÖSCHEN)**
Press to skip unnecessary channels in tuner presetting; press to cancel the preset programme in timer programming.

㉔ **Timer button (SCHALTUHR)**
Press to engage the timer recording standby mode.

Remote Control Unit

㉕ **VIDEO operate button (VIDEO BETRIEB)**
Press to turn the recorder power on or off.

㉖ **MONITOR TV/VIDEO button**
This button switches the connected TV between the TV and VIDEO mode.

TV mode: To receive the video and audio signals output from the recorder's RF OUT connector. Normally set the TV to this mode when playing back video cassettes or recording TV programmes while watching them.

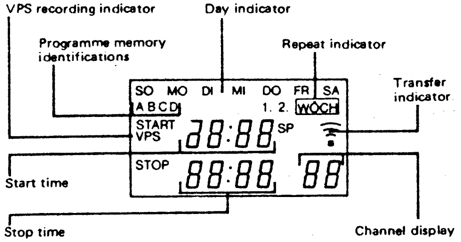
VIDEO mode: To receive the audio and video signals output from the 21-pin AUDIO/VIDEO connector. Set the TV to the VIDEO mode (usually referred to as the AV mode) when playing back video cassettes if the HR-D320EG is connected to the TV's AV terminal (21-pin connector).

● **TV operate button (TV-BETRIEB)**
Press to turn the TV power on or off. (Designated TV models only.)

● **TV Volume buttons (TV-LAUTSTÄRKE)**
Press "–" or "+" to decrease or increase the TV's sound volume.

● **TV Channel buttons (TV-KANAL)**
Press to select a desired channel on the TV receiver.

● **LCD (Liquid Crystal Display) panel**
Refer to this panel when programming the remote control's built-in timer memory.



● **Display button (ANZEIGE)**
Functions in the same way as the UHR/ZÄHLWERK/LAUFZT. button ● .

● **Memory programme button (SPEICHER AUFZ. NR.)**
Press to programme the remote control's timer memory.

● **Memory cancel button (SPEICHER LÖSCHEN)**
Press to cancel the programmed data in the remote control's timer memory.

● **Timer button (SCHALTUHR)**
Press to engage the timer recording standby mode.

● **Transfer button (ÜBERTRAG)**
Press to transfer the data heid in the memory to the recorder.

● **Multi-purpose numeric keys**
Channel selection: See page 24.
Timer programming: See page 29.
External source recording: See page 31.

● **VPS button**

● **Programme button (AUFZ. NR.)**
Press to set the recorder to the Timer Set mode.

● **Cancel button (LÖSCHEN)**
Press to cancel the programmed data held in the recorder's timer memory.

● **CURSOR/TV PR. buttons**

● **Rewind and Fast-Forward (Shuttle Search) buttons (RÜCK. and VOR.)**

● **Record button (AUFNAHME)**

● **Play button (WIEDERGABE)**

● **Pause/Still button (PAUSE/STANDB.)**

● **STOP button**

Remote Control Unit

A/B mode switching

A switch on the back of the remote control labelled A/B is accessible when the battery compartment cover is removed.

- This switch is preset to the "A" position. Do not touch it unless you use two JVC video decks side by side.
- When you place two JVC video decks near each other, use this remote control in the "B" mode to prevent both decks from responding simultaneously to this remote control's signals. For this purpose, carefully follow the instructions below:

(1) Unplug the power cord of the HR-D320EG from the AC outlet.
(2) Set the remote control unit's A/B mode switch to "B".
(3) Plug the power cord of the HR-D320EG into the AC outlet.
(4) Turn on the power of the HR-D320EG using the remote control's VIDEO BETRIEB button.
  - The HR-D320EG "memorises" this B code and then will respond only to the signals of this remote control unit. The other deck will respond only to its remote control.

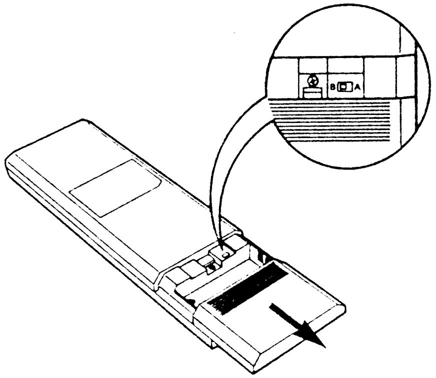
  Note:
  Do not operate other remote controls after you have plugged the HR-D320EG into the AC outlet and before you press the VIDEO BETRIEB button of this remote control.

Operating distance for remote control unit

- The maximum operating distance is about 8 m.

Installing the batteries

- Insert two "R6"-size batteries (provided) into the battery compartment on the rear of the remote control unit, observing correct polarity.



Rear Panel

● **Aerial input connector (ANTENNEN-EINGANG)**
Connect an aerial to this connector.

● **TEST signal switch**
Set to EIN when tuning your TV receiver for the video channel. A test signal in the form of two vertical white bars will be available.

● **Vertical lock adjustment screw (V-BILDFANG)**
When operating in the Still mode, adjust this screw to eliminate any vertical vibration of the picture. (For any inquiry about this adjustment, contact a JVC dealer.)

● **AUDIO/VIDEO socket**
A 21-pin standardised audio/video input/output socket for the connection to a TV or a 2nd video recorder equipped with the same type of socket. The input from this socket can be recorded in the AUX mode engaged by obtaining "AU" in the channel display.

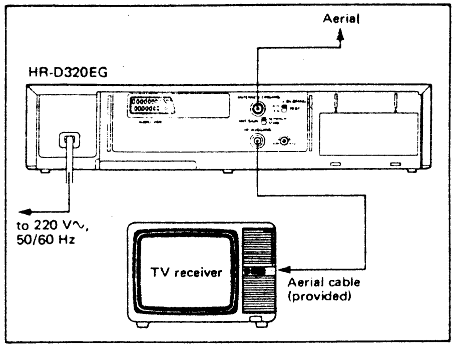
● ***RF output connector (HF-AUSGANG)***
Connect to the aerial terminal of a TV receiver through the aerial cable (provided).

● **RF converter frequency adjustment screw**

● **Attenuator switch (ANT. SIGN.)**
Set to SCHWACH to receive broadcasts from distant stations. Set to STARK to receive broadcasts of high field strength.

● **Power cord**

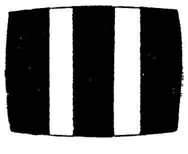
CONNECTIONS



1. Remove the aerial cable from the TV receiver and reconnect it to the recorder's ANTENNEN-EINGANG ● connector. The recorder is then ready to record off-air programmes.
2. Connect the recorder's HF-AUSGANG connector ● to the TV receiver's aerial terminal using the provided aerial cable. The TV receiver is then ready to receive broadcast programmes as well as accommodate video cassette playback.

VIDEO CHANNEL SETTING

1. Press the BETRIEB button ❻ to turn the power on. Turn on the TV receiver.
2. Set the TEST switch ● to EIN.
3. Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This is your VIDEO CHANNEL.



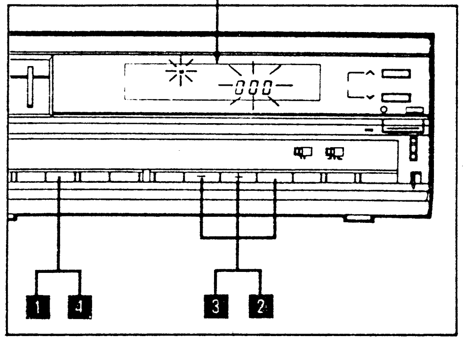
4. Reset the TEST switch to AUS.

Notes:

- If some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36. Consult your JVC dealer for making this adjustment.
- Video channel setting is also possible using a prerecorded VHS video cassette. Play back the tape and tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.

CLOCK SETTING

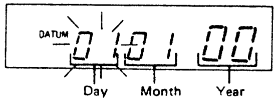
Plug the recorder into an AC outlet. The display shows a blinking SO 0:00.



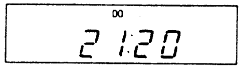
Notes:

- Clock setting is not possible in the timer recording standby mode. First check to see that the TIMER indicator on the FDP is not lit.
- Enter the day within 10 seconds after pressing the UHREINSTELLUNG button.

1. Press UHREINSTELLUNG ⓰ . The display will change as illustrated.



2. Set the day, month and year in succession by using the VORWAHL and EINGABE buttons ㉓ ㉔ alternately.
   - The blinking position is ready for entry.
   - Press EINGABE until the correct indication appears in each position.
   - In year setting, set only the last two digits of the year.
   - After year setting, the display changes to the next stage.
   - This date setting is necessary for the VPS system to function correctly. Once it is set correctly, there is no need to check the date.
3. Set the hour and minute in the same way.
4. Press UHREINSTELLUNG.
   - The day-of-the-week indication will be displayed automatically.



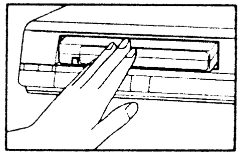
Power failure indicator

The blinking SO 0:00 (initial condition of the display) is also a power failure indicator, showing that there has been a power failure exceeding 10 seconds. Re-adjusting the time restores the normal condition of the clock display.

LOADING AND UNLOADING A CASSETTE

Loading

Insert a cassette as illustrated. Be sure to insert it firmly into the slot; otherwise, it will be automatically ejected.



- The automatic loading mechanism will operate only when the cassette is inserted correctly.
- With a cassette inserted, the "cassette loaded" indicator will appear on the FDP.

Unloading

Press the KASSETTE button ❼.

CAUTION

- If unloading of the cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the SCHALTUHR button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.
- Do not insert fingers or any foreign object beyond the door of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

AUTO POWER-ON AND AUTO PLAY SYSTEM

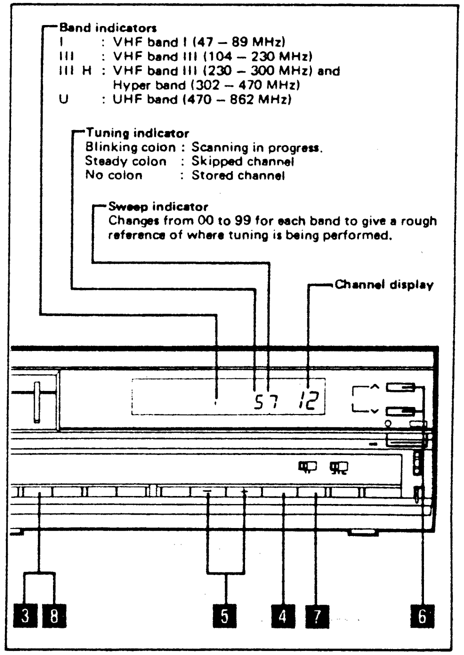
- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.

POWER-OFF EJECT SYSTEM

- The cassette can be unloaded even after the power has been turned off. Pressing the KASSETTE button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

OPERATING THE BUILT-IN TUNER

The HR-D320EG incorporates a voltage synthesized tuner with 48-channel preset capacity. Only channels stored can be called up with the TV PROGRAMM buttons in modes other than Channel Set. In the Channel Set mode, all channel numbers including skipped ones are successively displayed so that they can be stored or skipped.



Band indicators

I : VHF band I (47 – 89 MHz)
III : VHF band III (104 – 230 MHz)
III H : VHF band III (230 – 300 MHz) and Hyper band (302 – 470 MHz)
U : UHF band (470 – 862 MHz)

Tuning indicator

Blinking colon : Scanning in progress.
Steady colon : Skipped channel
No colon : Stored channel

Sweep indicator

Changes from 00 to 99 for each band to give a rough reference of where tuning is being performed.

Channel display

Available channels in each band

Band indicator	Frequency	Channels
I	VHF band I (47 – 89 MHz)	E2 – E4 (Common European channels) X, Y, Z (Switzerland) A, B, C (Italy) S1 – S3 (Belgium)
III	VHF band III (104 – 230 MHz)	E5 – E12 (Common European channels) S1 – S10 (West Germany, Switzerland) D, E, F, G, H (Italy) M1 – M10, 80 – 89 (Belgium)
III H	VHF band III (230 – 300 MHz) Hyper band (302 – 470 MHz)	S11 – S41 (West Germany) U1 – U10, 90 – 99 (Belgium)
U	UHF band (470 – 862 MHz)	E21 – E69 (Common European channels)

Storing channels

1. Turn on the TV receiver and adjust it to your video channel.
2. Turn on the recorder.
3. Press KANALEINSTELLUNG ●.
4. Press VORWAHL ㉓ until the correct band indication appears.
5. Press KANAL SUCHLAUF ㉔ until the desired broadcast signal is detected; use either the "–" or "+" button depending on the direction of search.
   - The tuning indicator "colon" will blink and the sweep indicator will count down or up.
6. Press TV PROGRAMM ❹ to select the channel to be stored.
7. Press SPEICHERN ㉒. The "colon" will disappear.
   - Repeat steps 4 through 7 for all necessary channels.
8. Press KANALEINSTELLUNG to disengage the Channel Set mode.

Skipping channels

1. Press TV PROGRAMM to select the channel to be skipped.
2. Press KANALEINSTELLUNG.
   - The band indicator and the sweep indicator corresponding to the broadcast stored in that channel will appear.
3. Press ÜBERSPRINGEN ●. The steady "colon" will appear.
4. Press KANALEINSTELLUNG to disengage the Channel Set mode.

Scanning channels

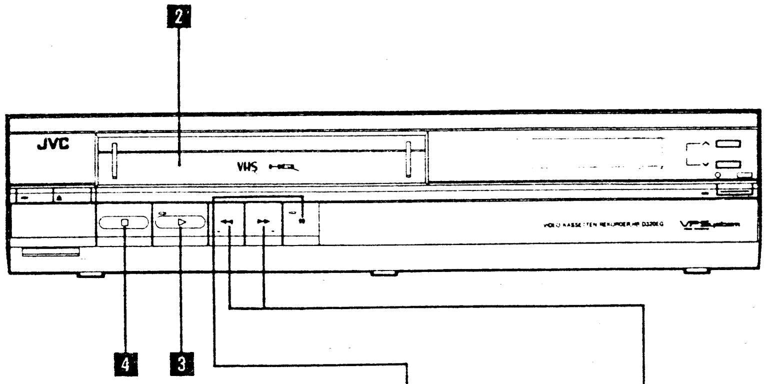
Stored channels can be called up in ascending or descending order by using the TV PROGRAMM buttons ❹ on the recorder or the TV PR. buttons ● on the remote control.

Selecting channels

By using the remote control unit's numeric keys ●, direct-access channel selection is also possible.

- When using the 10 numeric keys, pay attention to the following: when 1, 2, 3 or 4 is entered, it blinking until it remains lit. To key in a two-digit number, enter the 2nd number while 1, 2, 3 or 4 is blinking. The number entered first will be shifted to the tens place and channels 10 to 48 can be set. Invalid numbers (larger than 48) will be rejected.

PLAYING BACK A VIDEO CASSETTE



1 Turn the TV receiver on and adjust it to your video channel.

2 Load a pre-recorded cassette.
- Power will be switched on automatically.
- When the cassette loaded has no safety tab, playback will start automatically.

3 Press WIEDERGABE ❾.

4 Press STOP ❽ at the end of the programme.
- The tape will be rewound automatically when its end is reached and the recorder will enter the Stop mode.

SHUTTLE SEARCH

Shuttle Search allows high-speed playback at 9 times normal speed in either direction.

1. Press either RÜCKLAUF or VORLAUF BILDSUCHLAUF ❿ during playback.
2. To cancel the Search mode, press WIEDERGABE.
   - For briefer scanning, keep the BILDSUCHLAUF button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

STILL PICTURE

1. Press PAUSE/STANDB. ⓫ during playback.
2. To advance the still picture, press PAUSE/STANDB. a number of times.
   - Keeping this button pressed continuously advances the picture to give a slow-motion effect.
3. To cancel the Still mode, press WIEDERGABE.

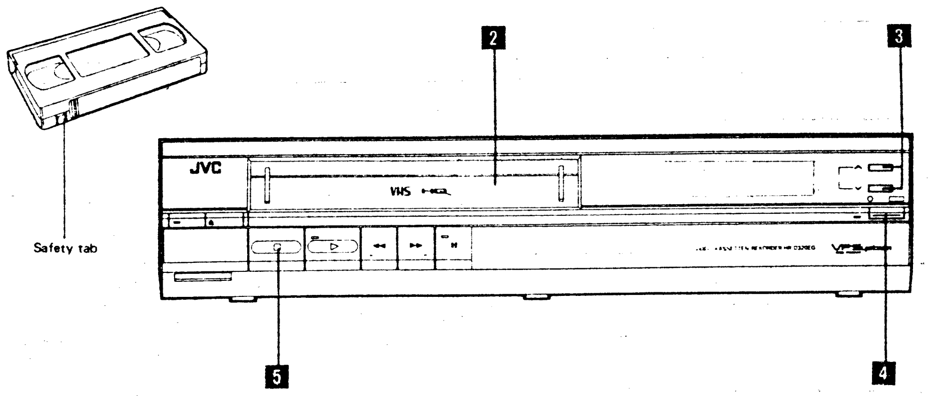
Notes:
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- With some televisions, the still picture may be unstable. This is not due to any defect of the unit.

Tracking Adjustment

Noise bars may appear on the screen if you play back a tape which was recorded using another recorder. For correction, press either SPURLAGE control ⓭. Tracking will be reset to the preset standard each time the cassette is ejected.

Note:
Only SP (Standard Play) recordings can be played back.

RECORDING TV PROGRAMMES



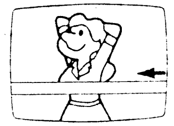
1 Turn the TV receiver on and adjust it to your video channel.

2 Load a cassette (with safety tab in place).
- Power will be switched on automatically.

3 Press either TV PROGRAMM ❹ to select the channel you wish to record.

4 Press AUFN./DA ❺ to start recording.
- Be careful to press AUFN./DA only once, or Instant Timer Recording will begin.
- Press AUFN. and WIEDERGABE simultaneously when using the remote control unit.
- If there is part of the programme you don't want to record, press PAUSE/STANDB. ⓫. A white horizontal bar will appear on the screen, which reduces in size in 4 steps as time elapses. When the last quarter starts blinking and disappears, the Stop mode will be entered automatically. The pause duration is possible for about 5 minutes.

Pause mode indicator



- To continue recording from the Pause mode, press WIEDERGABE ❾ while the white bar is on-screen.

5 Press STOP ❽ at the end of the programme.
- When the end of the tape is reached during recording, the tape is automatically rewound and stops.

Notes:
- If you want to start recording from the Play mode, first engage the Record-Pause mode by pressing PAUSE/STANDB., and then AUFN./DA. Then press WIEDERGABE.
- When recording is restarted from the Pause mode, a few frames recorded before are erased due to overlap of the new recording. This is not due to any defect of the unit.
- The selected channel cannot be altered during recording. If you wish to change the channel, first engage the Pause mode and then select a different channel.

INSTANT TIMER RECORDING

AUTO STOP
0:30

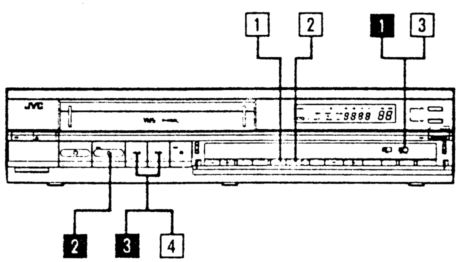
If you wish for recording to stop automatically after a certain period of time, use this Instant Timer Recording mode.

1. Press AUFN./DA during recording (or twice if in the Stop mode).
   - The FDP shows "AUTO STOP 0 : 30", showing that recording will automatically stop and power will switch off after 30 minutes.
2. Adjust the switch-off time, if necessary.
   - Press AUFN./DA to increase it in 30-minute increments (possible up to 4 hours).
   - Use VORWAHL and EINGABE to set to a more precise time when required (possible up to 4 hours 59 minutes). After setting the time, press VORWAHL so that all digits stop blinking.

RECORDING ONE PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy another programme.
- Select the channel you wish to record with the recorder's TV PROGRAMM buttons.
- Select the channel you wish to view with the TV receiver's channel selector.

INDEX SEARCH AND COUNTER SEARCH



VHS Index Search System

When you start recording from the Stop, or Timer Standby mode, an index code is marked on the tape. These index codes can be detected in the Shuttle Search mode.

1 Set ZIELSUCHLAUF ⓮ to INDEX.
2 Press WIEDERGABE ❾ to start playback.
3 Press RÜCKLAUF or VORLAUF BILDSUCHLAUF ❿ depending on the direction of search.
- While the tape is being scanned, "INDX" will be displayed on the FDP.

4 When the first index code is detected, normal playback resumes automatically. To search for the next index code, press the same button once again.

Counter Search

The counter reading of "0000" can be located automatically.

1 Press UHR/ZÄHLWERK/LAUFZT. ⓱ to obtain the Counter mode.
2 Press ZAHLWERK-RÜCKST. ⓯ during playback or recording at a point which you wish to locate later.
3 Set ZIELSUCHLAUF to ZÄHLWERK.
4 Press RÜCKLAUF or VORLAUF when you need to return to the designated point.
- The tape will stop automatically at about "0000".
- When used in conjunction with the Memory Play function, this offers more convenience. See below.

ELAPSED RECORDING TIME INDICATOR

The tape counter is switchable to the elapsed recording time indicator.

1. Press UHR/ZÄHLW./LAUFZT. to obtain the Lap mode.
   - The lap time is counted up to 9 hours 59 minutes.
2. To reset the lap time to "0 :00", press ZÄHLWERK-RÜCKST.

Notes:
- Unless the ZÄHLWERK-RUCKST. button is pressed in the Lap mode, the count is maintained even after the power is switched off (as long as the unit remains plugged in to an AC outlet).
- When the Lap mode is engaged during playback, counting does not take place, even though the current count is displayed.

NEXT-FUNCTION MEMORY

Memory Play function

- If you want to watch the tape from its beginning after rewinding, press RÜCKLAUF and then WIEDERGABE within 2 seconds. Playback will start automatically at the beginning of the tape. (The ZIELSUCHLAUF switch must be in the AUS position.)
- If you want to watch the tape from the counter reading of "0000", set ZIELSUCHLAUF to ZÄHLWERK, press RÜCKLAUF (or VORLAUF) and then WIEDERGABE within 2 seconds.

Memory Eject/Power-Off/Timer Standby

If you are going to eject the cassette, turn the power off or engage the Timer Standby mode after rewinding the tape, you do not have to wait for completion of rewind to press the corresponding button.

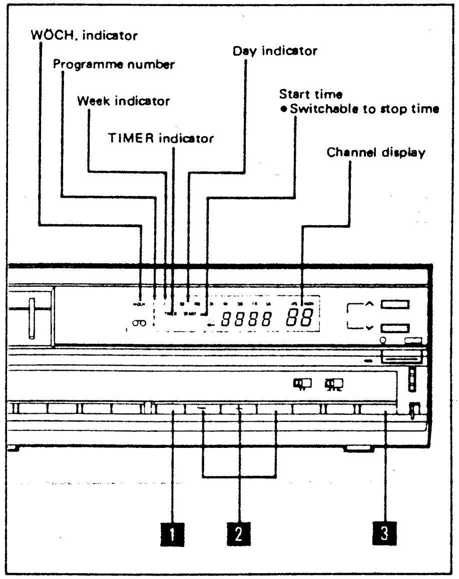
- To eject the cassette after rewind, press RUCKLAUF and then KASSETTE within 2 seconds.
- To turn the power off after rewind, press RÜCKLAUF and then BETRIEB within 2 seconds.
- To engage the Timer Standby mode after rewind, press RÜCKLAUF and then SCHALTUHR within 2 seconds.

AUTOMATIC TIMER RECORDING

First of all, load a cassette (with safety tab in place); power will be switched on automatically.

Two ways to perform timer programming

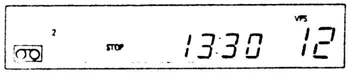
A. **Local programming:** Programme the timer using the recorder's controls while referring to the recorder's FDP.
B. **Independent remote programming:** Programme the remote control's memory using the remote control's keys while referring to its own LCD and then transfer the data to the recorder.



A. Local Programming

1 Press AUFZ. NR. ⓳.
- The display will change to the Timer Set mode for programme number "1". To advance to programme number 2, 3 or 4, press AUFZ. NR.

2 Set the day, start time, channel and stop time in succession by using the VORWAHL and EINGABE buttons ㉒ ㉔ alternately.
- Select the item to be set with the VORWAHL button; the selected item will blink.
- Set the desired data with the EINGABE buttons.



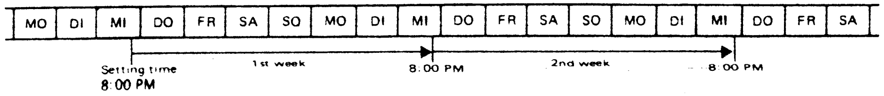
- When not using the VPS recording system, press VPS to make "VPS" disappear.
- Be sure to turn off "VPS" for timer programming to record external sources.

3 After making sure that the cassette is loaded, press SCHALTUHR ㉓.
- The Timer Recording Standby mode will be engaged with the TIMER indicator and the preset programme number(s) illuminated and the power turned off.
- With no cassette loaded, the TIMER and "cassette loaded" indicators will continue blinking.
- A cassette whose safety tab has been removed will be ejected automatically.
- If a preset programme contains errors, that programme number will not be illuminated. Recheck the programmed data.
- If illuminated programme numbers are blinking, the time spans of those programmes overlap. Recheck their programmed data.

Setting the day

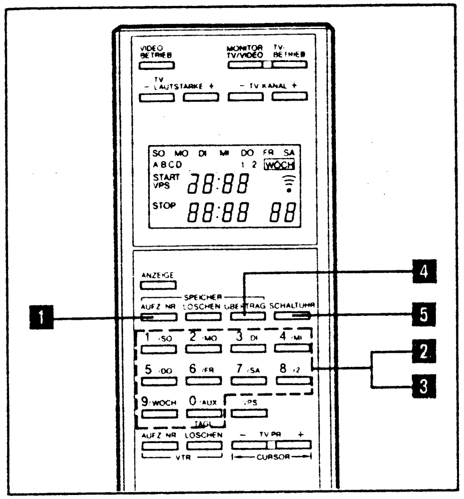
- With the EINGABE "+" button, the day indication advances from "SO" (first Sunday) to "SA" (first Saturday), then "2. SO" (second Sunday) to "2. SA" (second Saturday) and then the all-days indication with "WÖCH." for daily serial recording.
- For weekly serial recording, press the WIEDERHOL. button any time in the Timer Set mode.
- The "WÖCH." entry can be cancelled by pressing the WIEDERHOL. button.

Note:
- The 1st week refers to the seven-day period from the present day and the 2nd week, to the following seven-day period (not weeks on the calendar). These two weeks are counted from the time of setting.



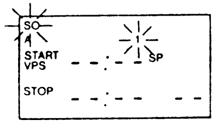
B. Independent Remote Programming

- The remote control incorporates 4 programme memories (A, B, C and D).
- The programmed data is held in memory even after it has been transferred to the recorder.



1 Press SPEICHER AUFZ. NR. ●.

- The LCD will be activated for programme memory "A".
- To advance to programmes B to D, press again.

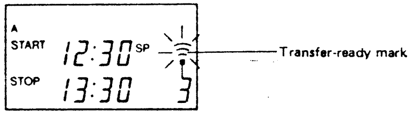


2 Enter the day using numeric keys ●.

- To set for the 2nd week, press 2. (8) before entering the day or while the start hour is blinking.
- To record a daily serial, press TÄGL. (0); then the all-days indication with "WÖCH" will be displayed.
- To record a weekly serial, press WÖCH. (9) before entering the day or while the start hour is blinking.

3 When the display changes to the next stage, key in the start time, stop time and channel in succession using numeric keys.

- Invalid numbers will be rejected.
- To key in a one-digit number of hours or minutes, first press "0". Then press the relevant numeric key.
- For keying in channel numbers, refer to page 24.
- After the channel has been entered, the transfer-ready mark will appear and blink.
- When not using the VPS recording system, press VPS to make "VPS" disappear.
- Be sure to turn off "VPS" for timer programming to record external sources.



4 Direct the remote control to the recorder's FERNB. SENSOR window ❶ and press ÜBERTRAG ●.

- The programmed data will be loaded in one of the recorder's memories (1 – 4), the vacant one of the smallest programme number.
- If all programme memories are full, the recorder's clock will blink and transmission will not take place.
- When this happens, you can clear the recorder's memories from the remote control. Press the VTR AUFZ. NR. ● button to call up a programme to be cleared on the FDP and press the VTR LÖSCHEN ● button.
- After having cleared the recorder's programme memory, transfer the data once again. If the LCD has blacked out, press the SPEICHER AUFZ. NR. button for the intended programme number and press the ÜBERTRAG button while the transfer-ready mark is blinking.

5 Press SCHALTUHR ●.

- Check to see that the TIMER indicator and other items on the recorder's FDP respond correctly. See page 28.

Setting the start and stop times and channel

- It is not possible to set the start and stop times unless clock have previously been set.
- Enter the data while the digits are blinking.
- The stop time can be set within 24 hours from the start time.
- Non-applicable numbers (such as 24 or larger for hours, 60 or larger for minutes and 49 or larger for channels) will be rejected.

How to use the CURSOR keys

- If you press a wrong key and the flashing position has advanced, press "-" to return to the previous position for correction.
- Once all data have been programmed, you can reach any position for correction using "-" or "+". The flashing position is ready for re-entry.
- The cursor (flashing position) advances or returns in the following order.

Day ⇄ Start time ⇄ Stop time ⇄ Channel

(Pressing SPEICHER AUFZ. NR. engages the check mode in which the transfer-ready mark is blinking and data correction is not possible. To correct the data, press either CURSOR key; "+" to move to "Day" or "-" to move to "Channel".)

IMPORTANT INFORMATION ON TIMER RECORDING

Cancelling the preset data

- The preset programmes can be cancelled. First engage the Timer Set mode for the programme number you wish to cancel and then press the LOSCHEN button ● or ●.
- Unless the VPS mode is engaged, an executed programme is automatically cleared.

Checking the programmed data

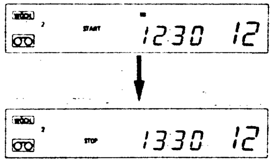
- Checking and re-programming can be performed anytime, even when the SCHALTUHR button has already been engaged.
- While recording is actually taking place according to one preset programme, all other preset programmes can be checked or re-programmed.
- To disengage the Timer Set mode, press the UHR/ZÄHLWERK/LAUFZT. button ● (on the recorder) or the ANZEIGE button ● (on the remote control).

Timer recording operation

- When the preset start time is reached, recording starts.
- After timer recording, the power is switched off. If the tape end is reached during timer recording, the cassette is automatically ejected and the power is switched off.
- After all preset programmes have been executed, the Timer Standby mode is cancelled.

Reviewing the programmed data

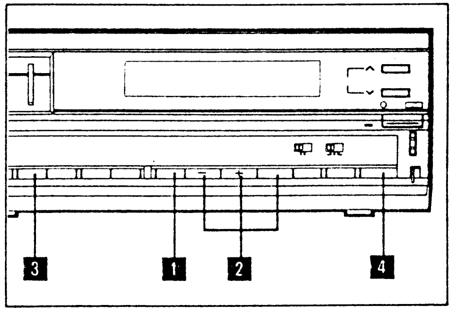
- Press the AUFZ. NR. button in the Timer Standby mode; the programmed data of the earliest-to-start programme will be shown for 6 seconds (3 seconds for START and 3 seconds for STOP) and then those of subsequent programmes, if any, in the same manner.



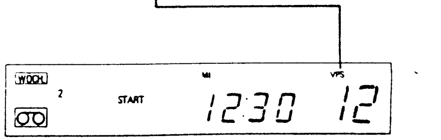
- If you wish to change the programmed data, engage the Timer Set mode (first press the SCHALTUHR button to disengage the Timer Standby mode and then press the AUFZ. NR. button) and call up the corresponding programme number for reprogramming.

VPS RECORDING

In the VPS (Video Programme System) system, TV stations transmit different VPS codes for different TV programmes, which control the starting and stopping of the video recorder and have precedence over times preset in the timer for accurate recording of a particular programme from start to finish.



VPS indicator
Illuminated: VPS standby mode
Blinking: VPS recording in progress



1 Press AUFZ. NR. ●.

2 Set the day, start time, stop time and channel in the same way as for timer programming.

3 Make sure that the VPS indicator is lit; if not, press VPS ●.

- All timer data will be converted to VPS codes and stored in memory.

4 Press SCHALTUHR ●.

- If the preset start time is between 4:00 and 23:59, the recorder will enter the VPS standby mode at 0:00 on the preset day and remain engaged until 4:00 on the following day, if the intended programme has not yet been broadcast.
- If the preset start time is between 0:00 and 3:59, the recorder will enter the VPS standby mode at 20:00 on the previous day.
- When a VPS code corresponding to the intended TV programme is detected during the VPS standby mode, recording will start. When the VPS code changes to another, recording will stop.
- When an interruption code is detected during VPS recording, the VPS standby mode is engaged and recording restarts when the regular VPS code is restored.

Notes:

- If no VPS code is detected from that station or a system status code which cancels VPS recording is detected, ordinary timer recording will be engaged.
- Operation at the end of VPS recording is the same as with ordinary timer recording.

RECORDING FROM AN EXTERNAL SOURCE

By connecting an external video source (such as a VideoMovie camera-recorder, 2nd video recorder, video camera, etc.) to the AUDIO/VIDEO socket, recording and/or editing are possible.

- For connection of these units, an appropriate cable is necessary.
- For connection of a video camera, a camera adapter is also necessary. Consult a JVC dealer.

1. Turn the power on for all connected equipment.
2. Adjust the TV receiver to your video channel.
3. Load a cassette.
4. Press either TV PROGRAMM button ❹ or the numeric key O/AUX ● to obtain "AU" in the channel display.
5. Operate the source equipment properly.
6. Press AUFN./DA ❺ .
7. To stop recording temporarily, press PAUSE/STANDB. ●
8. To end recording, press STOP ❽ .

Note:

- For the operation of the source equipment, refer to the instruction manual of the relevant machine.

IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first . . . .

Symptoms	Check points
No power is applied to the recorder.	● Is the power cord disconnected? Connect it.
Playback picture does not appear while the tape is running.	● Is the TV receiver's channel selector set to the correct video channel? Set to the RF converter channel.
Tape does not run in the Record mode.	● Is the PAUSE/STANDB. button pressed? Press WIEDERGABE to release.
AUFN./DA button cannot be engaged.	● Is the cassette improperly loaded? Load it properly. ● Is the safety tab broken? Reseal the slot.
Tape stops in the Rewind or Fast Forward mode.	● Is the ZIELSUCHLAUF switch set to ZÄHLWERK? Set to AUS.
Tape will not rewind.	● Is the tape already rewound to the end?
Noisy playback picture.	● Adjust with the SPURLAGE controls.
Pressing PAUSE/STANDB. during playback brings a still picture (in a frame-by-frame manner) with noise bars.	● Noise bars can be eliminated by pressing the PAUSE/STANDB. button a few more times.

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and check the functions.

HEAD CLEANING

- Picture playback may become blurred or interrupted while the TV programme received is clear. This does not mean that the recorded programme has been erased.
- Dirt accumulated on the video heads after long periods of use causes such problems. In this case, head cleaning requiring highly technical care is necessary.

For head cleaning, consult the nearest JVC dealer.

SECTION 1
MECHANISM ADJUSTMENTS

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set when the cassette housing is separated from the main-deck, perform as below.

1) Set a sheet of insulated material on the right of the chassis.
2) Remove the cassette housing from the main-deck and place it on the insulated sheet, but do not disconnect the connector from the MAIN PWB.
3) Insert a cassette into the cassette housing. The housing mechanism functions to retract the cassette.
4) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
5) The desired modes can be obtained by using the operation switches.

1.1.2 Required test equipment, fixtures and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

1. Test equipment required:

Color television or monitor
Oscilloscope: Wide-band, dual trace, triggered, delayed sweep
Recording tape
Alignment tapes
Signal generator : PAL color bars, stairstep

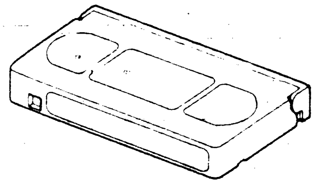
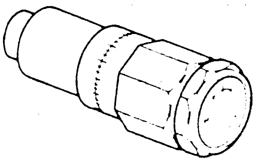
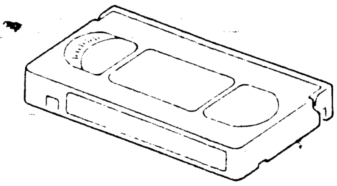
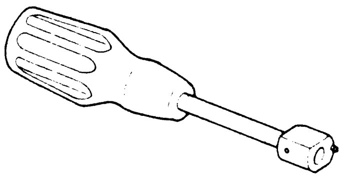
JVC alignment tape MH-2 	Torque gauge assembly PUJ48075-2 (Torquemeter : 600ATG Torquemeterhead : PUJ48016-2) 	Back tension cassette gauge PUJ48076-2 
A/CTL head position tool PUJ47351-2 		

Table 1-1-1 Fixtures and tools

1.1.3 Disassembly (external covers)

1. Top cover
1) Take out five screws from the right, left and rear sides of the set.
2) Tilt up the rear end of the top cover, then remove the top cover.

2. Bottom cover
1) Take out five screws from the bottom side of the set.
2) Set free the bottom cover from six claws of the chassis in order to remove the bottom cover.

3. Front panel assembly
1) Remove the top cover.
2) Bend three upper hooks of the front panel assembly upward in order to disengage them from their chassis retainers.
3) Disengage three lower hooks of the front panel assembly from their chassis retainers in order to remove the front panel assembly from the chassis.

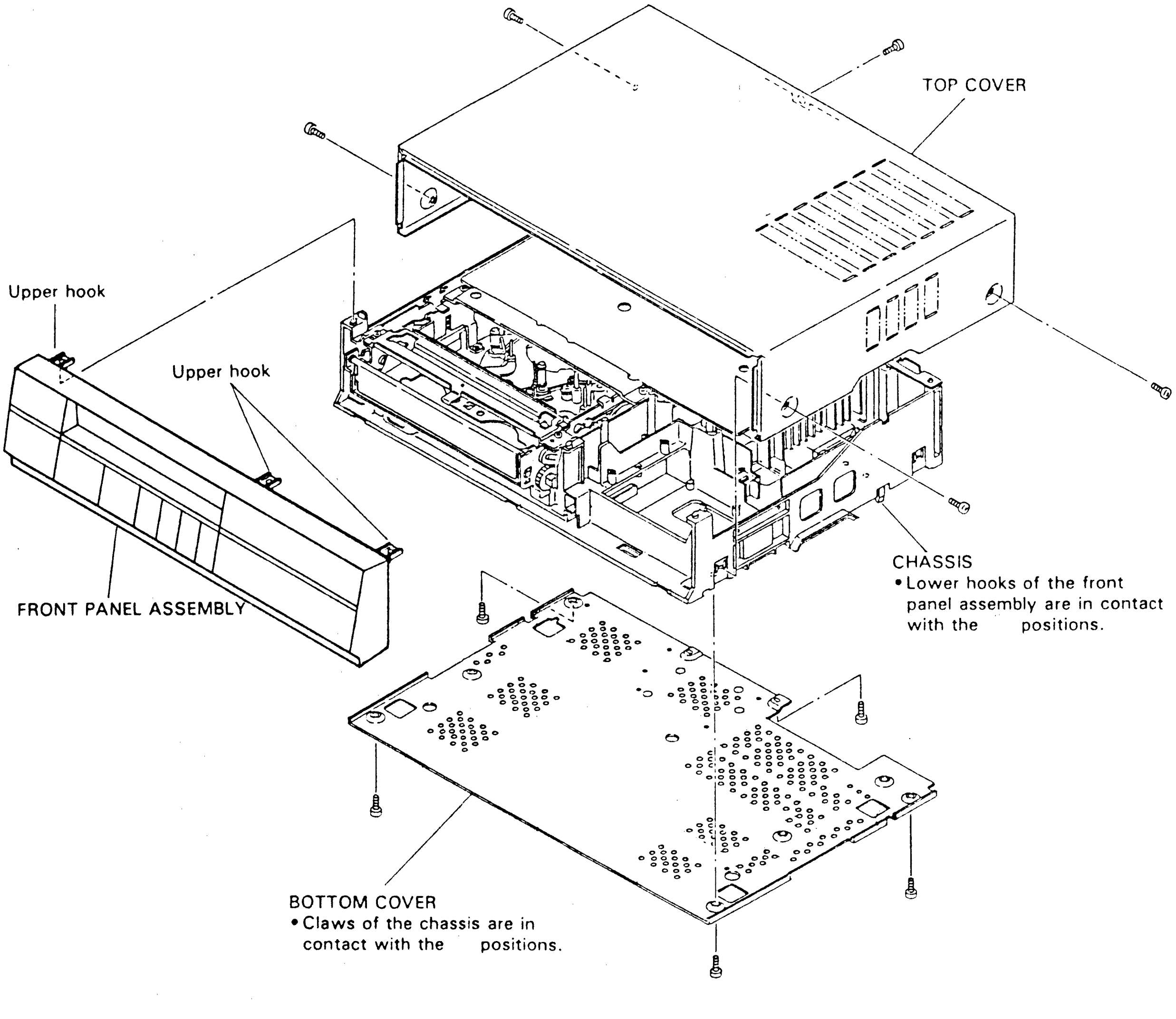

TOP COVER
Upper hook
Upper hook
FRONT PANEL ASSEMBLY
CHASSIS
• Lower hooks of the front panel assembly are in contact with the positions.
BOTTOM COVER
• Claws of the chassis are in contact with the positions.

Fig. 1-1-1 Removal of external covers

1.1.4 Layout of main parts

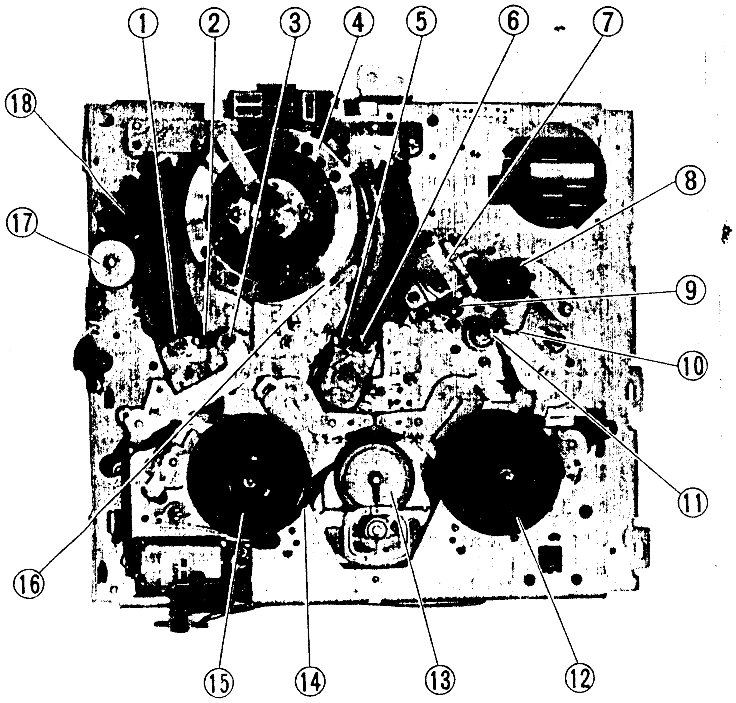


Fig. 1-1-2 Top view of main-deck

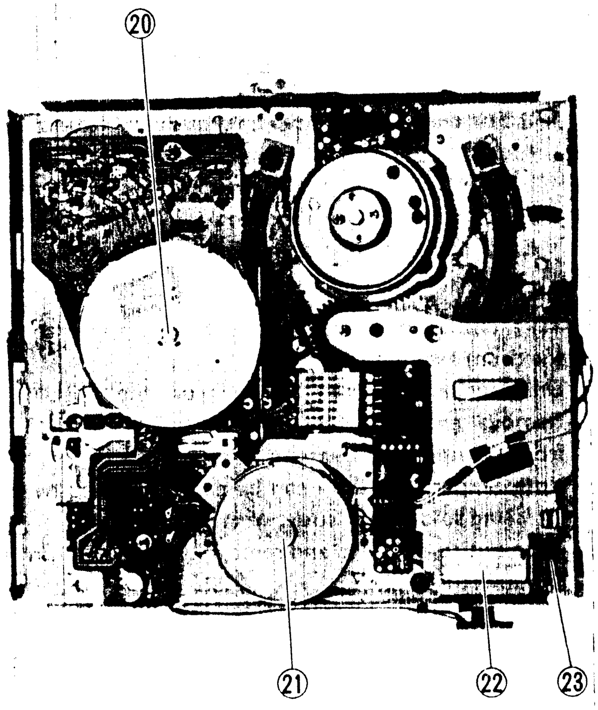


Fig. 1-1-3 Bottom view of main-deck

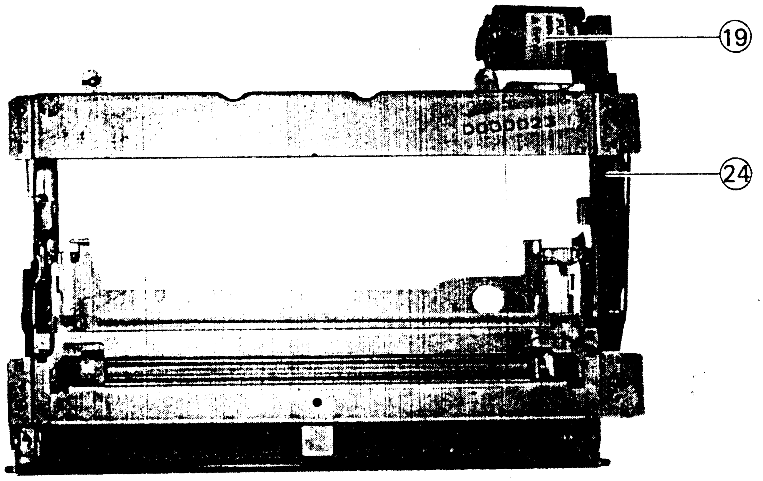


Fig. 1-1-4 Cassette housing

1. Supply guide roller
2. Supply slant pole
3. Tension pole
4. Upper drum
5. Take-up slant pole
6. Take-up guide roller
7. A/C head
8. Pinch roller
9. Take-up guide pole
10. Guide arm
11. Capstan
12. Take-up reel disk
13. Reel idler
14. Tension band
15. Supply reel disk
16. Lower drum
17. Impedance roller
18. Full erase head
19. Cassette motor
20. Capstan motor
21. Reel motor
22. Mode motor
23. Mode belt
24. Cassette belt

1.2 MAIN ASSEMBLY REPLACEMENT

1.2.1 Upper drum assembly

Notes: When handling and installing the upper drum assembly, avoid directly touching the head tips on the upper drum assembly.
For cleaning the head tips, push and hold a lint-free cloth or chamois dampened with alcohol to the upper drum assembly by the fingers, then turn the upper drum assembly clockwise. Do not clean the upper drum assembly with a vertical stroke.

1. Removal

1) Take out a screw and remove the brush assembly from the drum assembly.
2) Unsolder all soldered portions on the DRUM PWB. Remove excess solder, then remove the DRUM PWB from the upper drum assembly.
   Note: Soldered portion can be easily removed by removing solder with sucker or wick.
3) Take out two screws and remove the upper drum assembly upwards.

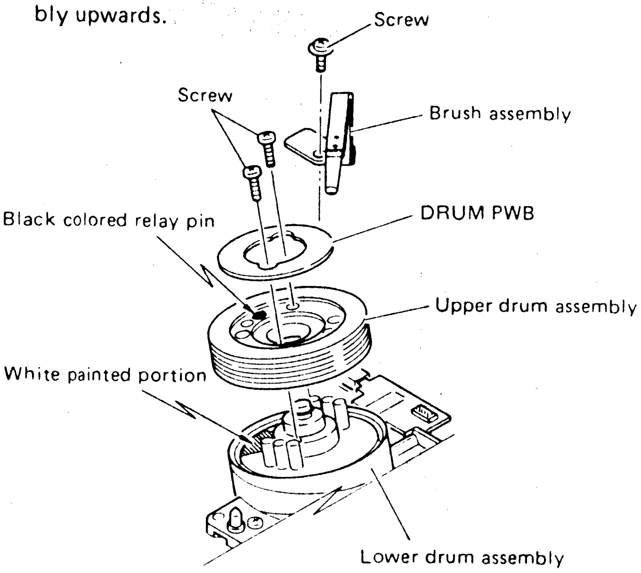

Screw
Screw
Brush assembly
Black colored relay pin
DRUM PWB
Upper drum assembly
White painted portion
Lower drum assembly

Fig. 1-2-1 Upper drum assembly

2. Installation

1) Install a new upper drum assembly so that the black-colored relay pin of the upper drum assembly overlies the white painted portion of the lower drum assembly, as shown in Fig. 1-2-1.

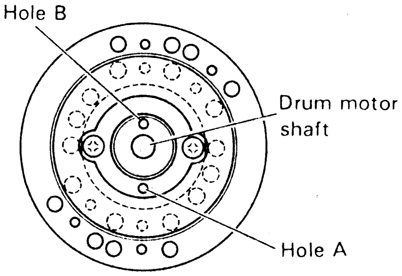

Hole B
Drum motor shaft
Hole A

Fig. 1-2-2 Polarity of the upper drum

Note: Be sure to position the upper drum correctly. As indicated in Fig. 1-2-2, set hole A of the upper drum opposite the shaft from hole B of the lower drum. Check for correct position before tightening the screws.

2) Tighten two screws in a balanced manner.
3) Set the DRUM PWB on the upper drum assembly, then resolder it.
4) Clean the drum unit (particularly clean the upper drum assembly).
5) Mount the brush assembly on the original position, then tighten a screw to fix the brush assembly.

3. Confirmation and adjustment

1) Perform the interchangeability confirmation. Refer to section 1.6.
2) Perform the PB switching point adjustment of the Servo (MAIN PWB) circuit. Refer to section 2.2.1.

1.2.2 A/C head (Audio/control head)

1. Removal

1) Disconnect connectors from the A/C HEAD PWB.
2) Take out two screws, then remove the A/C head and the head base together.
3) Unsolder and separate the A/C HEAD PWB from the A/C head.
4) Take out a screw and remove the shield cap from the A/C head.
5) Take out three screws and separate the A/C head from the head base. Use care regarding springs. Do not lose them.

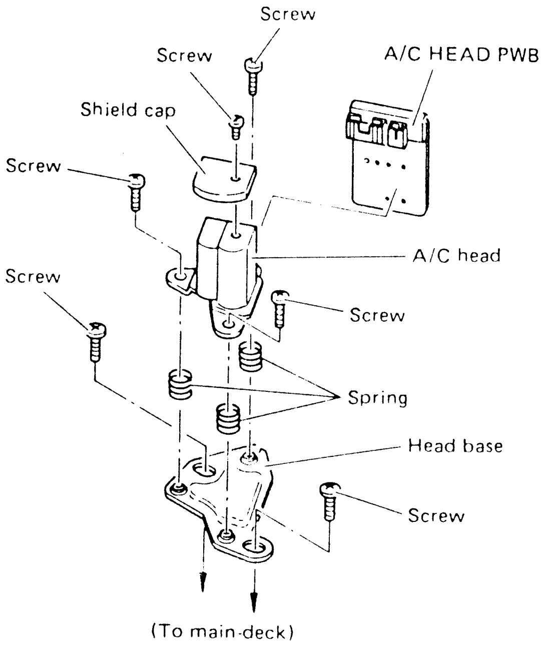

Screw
Screw
A/C HEAD PWB
Shield cap
Screw
A/C head
Screw
Screw
Spring
Head base
Screw
(To main-deck)

Fig. 1-2-3 A/C head

2. Installation

1) Mount a new A/C head and other peripheral parts on the main-deck by reversing the removal procedure.

2) Before installing the A/C head on the main-deck, perform rough-adjustment of A/C head height as shown in Fig. 1-2-4

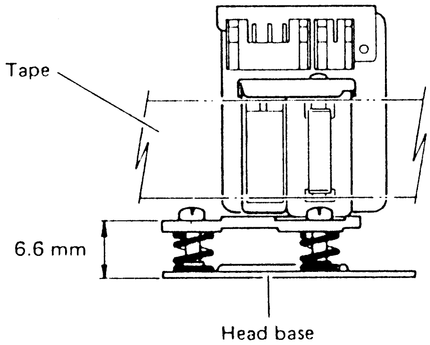

Tape
6.6 mm
Head base

Fig. 1-2-4 A/C head height

3. Confirmation and adjustment

1) Use a recording tape and confirm correct tape transport operation, then perform interchangeability adjustment. Refer to sections 1.5 and 1.6.

2) Perform overall confirmation of the Audio circuit. Refer to section 2.4.

1.2.3 Tension band assembly

1. Removal

1) Take out a screw, then pry the A portion of the tension band assembly upwards to separate it from the tension arm assembly.

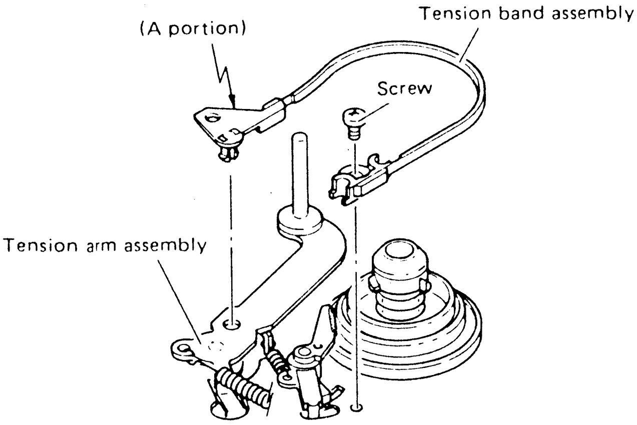

(A portion)
Tension band assembly
Screw
Tension arm assembly

Fig. 1-2-5 Tension band assembly

2. Installation

1) Install a new tension band assembly by reversing the removal procedure.

3. Confirmation and adjustment

1) Perform tension pole position adjustment. Refer to section 1.4.1.

1.3 ASSEMBLY PROCEDURE OF MECHANISM

The mechanism of this model is mostly engaged to the mechanism control circuit, through the mode select switch. Therefore, the relation between the mode select switch and the control arm decides all mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If these parts are not properly positioned, the unit will be unloaded or compulsorily stopped. This will result in damage of mechanical or electrical parts.

1.3.1 Loading arm assembly

Loading arm assembly consists of loading gear, torsion spring and loading arm.

1. Set up the loading arm assembly correctly as shown in Fig. 1-3-1.

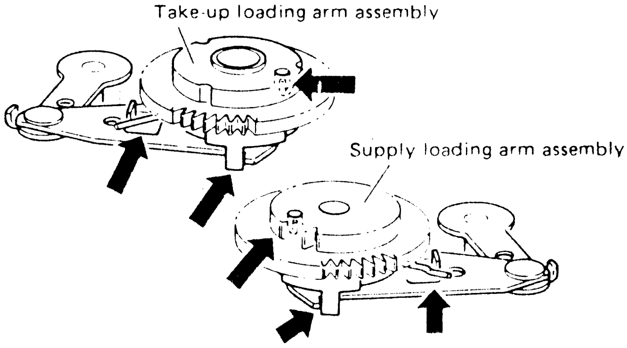

Take-up loading arm assembly
Supply loading arm assembly

Fig. 1-3-1 Loading arm assembly (1)

2. Install the take-up loading arm assembly and the supply loading arm assembly so that the holes on the loading gears face each other, as shown in Fig. 1-3-2. Do not move the loading arm assemblies from this position for the next step.

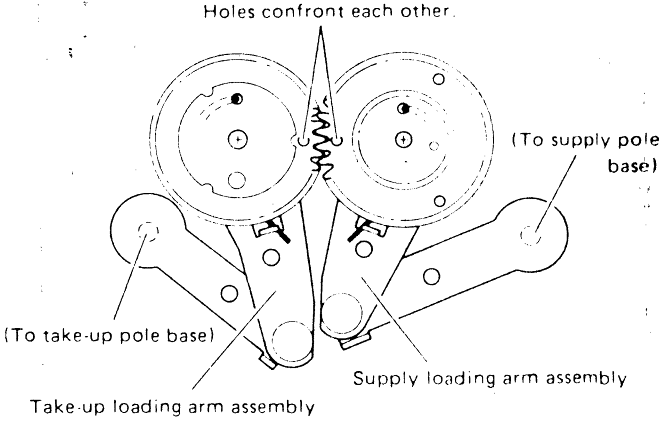

Holes confront each other.
(To supply pole base)
(To take-up pole base)
Supply loading arm assembly
Take-up loading arm assembly

Fig. 1-3-2 Loading arm assembly (2)

1.3.2 Control cam

1. Set the arm gear assembly on the cam bracket assembly so that the hole of the arm gear assembly overlaps the hole of the cam bracket assembly.
2. Install the control cam on the cam bracket assembly so that the hole of the control cam overlaps the hole which is indicated in the step 1), as shown in Fig. 1-3-3. Do not turn the control cam from this position for the next step.

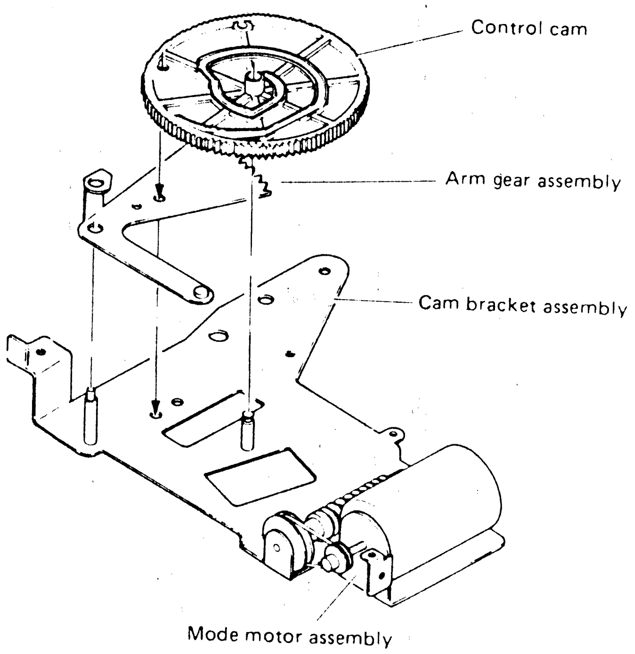

Control cam
Arm gear assembly
Cam bracket assembly
Mode motor assembly

Fig. 1-3-3 Control cam

1.3.3 Cam bracket assembly

1. Push and hold the plate assembly so that the hole of the plate assembly overlaps the hole of the main-deck, as shown in Fig. 1-3-4.
2. Then mount the cam bracket assembly.

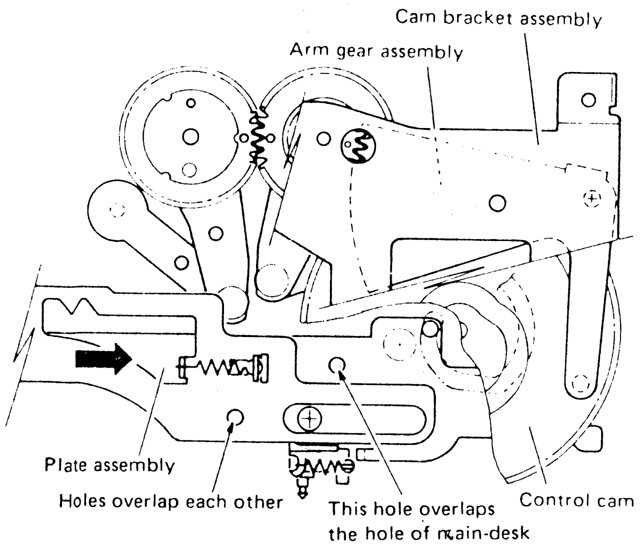

Cam bracket assembly
Arm gear assembly
Plate assembly
Holes overlap each other
This hole overlaps the hole of main-desk
Control cam

Fig. 1-3-4 Cam bracket assembly

Note: In order to overlap the holes turn the control cam fully counter clockwise by turning the mode motor with a finger.

1.3.4 Mode select switch

1. When the hole of the plate assembly overlaps the hole of main-desk, refer to Fig. 1-3-4, confirm that the V-cut of the slider section just overlaps the V-cut of the outer section of the mode select switch.
2. If a difference of more than 0.5 mm is noticed, adjust the mode select switch to the correct position, after unsoldering and loosening the screw.

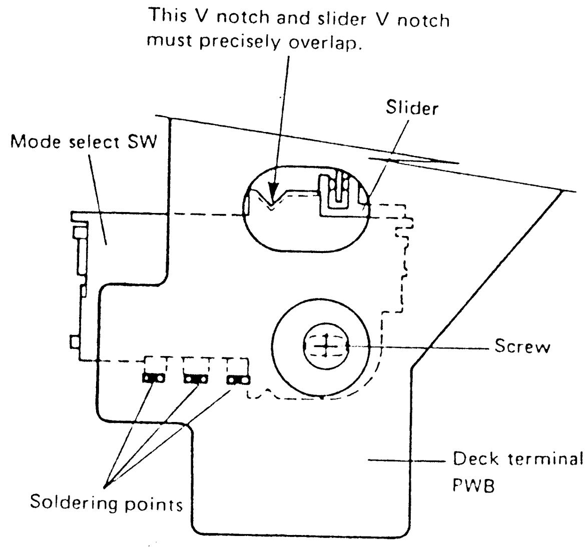

This V notch and slider V notch must precisely overlap.
Slider
Mode select SW
Screw
Deck terminal PWB
Soldering points

Fig. 1-3-5 Mode select switch

1.4 CONFIRMATION AND ADJUSTMENT

1.4.1 Tension pole position adjustment

1. Without loading a tape, set for the Play mode.
2. Loosen screw a little bit, then adjust the tension band holder so that the distance, shown in Fig. 1-4-1, becomes zero (0 mm).
3. Tighten screw to fix the tension band holder.

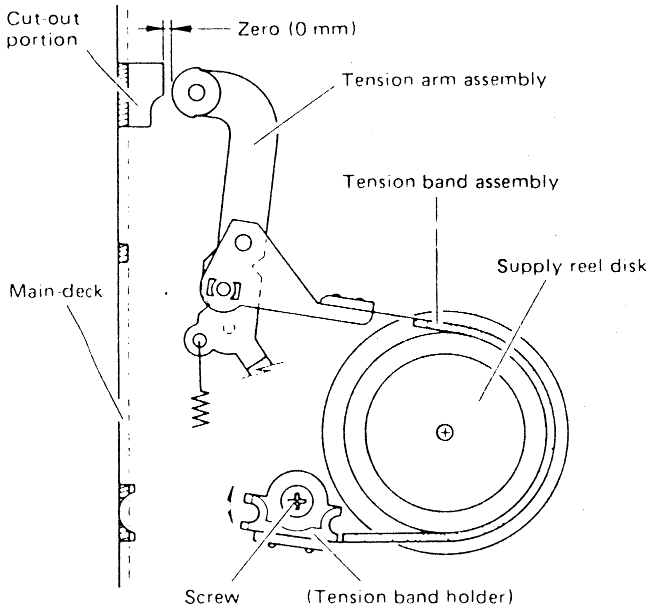


Fig. 1-4-1 Tension pole position

Note: By this adjustment, back tension is within normal specification, in spite of parts tolerances.

4. Use the back tension cassette gauge and set for the Play mode.
5. Confirm that the indication is between 25 – 75.

1.4.2 Take-up torque confirmation

1. Set the Play mode without the cassette housing assembly.
2. Set the torque gauge on the take-up reel disk.
3. The torque gauge consists of upper and lower sections connected by a spring mechanism. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speed, then read the indication. The correct value is between 45 – 155.
4. If necessary, clean or replace the idler arm.

1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT

Once adjusted to the complete condition, readjustment of the tape transport system is not necessary, except when the parts that compose the tape transport system are replaced due to troubles by long usage or unexpected accidents.

1.5.1 Tape transport system adjustment

1. Guide roller

   To get the FM envelope into ideal shape for interchangeability, the height adjustment of the guide roller is needed.

   Before turning the guide roller, slightly loosen the setscrew located under the guide roller. For loosening the setscrew, use the hex key (1.25 mm).

   Note: Loosen the setscrew enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the guide roller inadvertently.

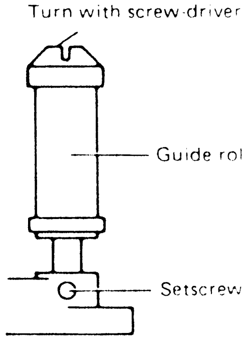


Fig. 1-5-1 Guide roller

2. Impedance roller

   Normally, do not adjust the height of the impedance roller. Only when the defects of tape travel are noted at the impedance roller, after complete adjustment for interchangeability, adjust the height of impedance roller to obtain smooth tape travel. For adjustment of impedance roller height, use the nut-driver (5.5 mm).

   Note: Do not lower the impedance roller excessively to avoid the defects of tape travel. Tape must be a long the lower flange located under the impedance roller.

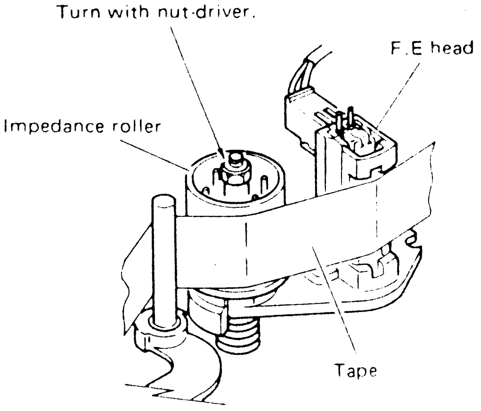


Fig. 1-5-2 Impedance roller

3. A/C head (audio/control head).
   When defects of tape travel are noted at the take-up guide pole, adjust the inclination of A/C head to obtain smooth tape travel.

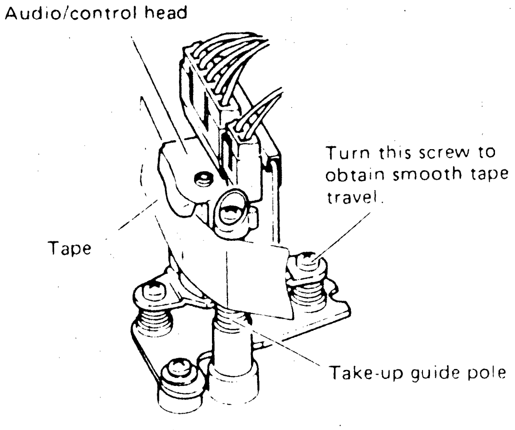

Audio/control head
Turn this screw to obtain smooth tape travel.
Tape
Take-up guide pole

Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CONFIRMATION AND ADJUSTMENT

Before using an alignment tape, use a recording tape and confirm correct tape transport operation.
For the FM envelope output, connect an oscilloscope to TP106 of the MAIN PWB. For audio output, connect to the AUDIO OUT terminal, and trigger the oscilloscope externally with the signal from TP411 of the MAIN PWB. Use only the stairstep segment of the alignment tape, do not use another segment for interchangeability.

1.6.1 FM envelope confirmation and adjustment

1. Push the TRACKING +/– buttons to obtain the maximum FM envelope output corresponding to (a) level in Fig. 1-6-1. Observe the FM envelope, read the maximum level (a) and the minimum levels (b), (c) and (d).
   Confirm that:

$$\frac{b}{a} \geq 0.7\ ,\ \frac{c}{a} \geq 0.5 \text{ and } \frac{d}{a} \geq 0.5$$

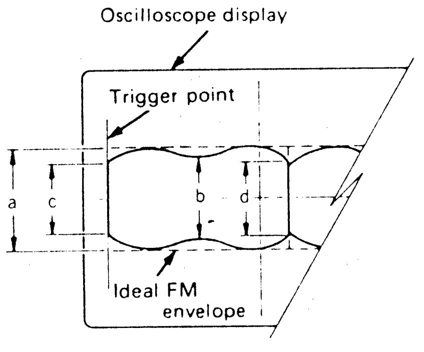

Oscilloscope display
Trigger point
a
c
b
d
Ideal FM envelope

Fig. 1-6-1 FM envelope

2. If defects are noted, following adjustments are required.
1) Observe the oscilloscope display and push the TRACKING +/– buttons to vary the FM output from maximum to minimum.
2) If the variation is not parallel at the rising portion (drum entrance) of the FM envelope, turn the supply guide roller so that the rising portion of the envelope becomes nearly flat, as shown in Fig. 1-6-2.

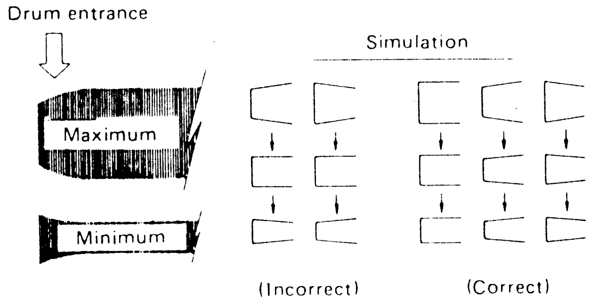

Drum entrance
Simulation
Maximum
Minimum
(Incorrect)
(Correct)

Fig. 1-6-2 Drum entrance

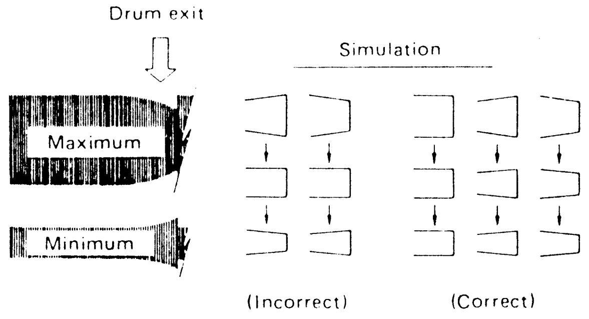

Drum exit
Simulation
Maximum
Minimum
(Incorrect)
(Correct)

Fig. 1-6-3 Drum exit

3) In the same manner as for the rising portion, turn the take-up guide roller to adjust the falling portion (drum exit) of the FM envelope. See Fig. 1-6-3.
4) In addition to observing the envelope, confirm absence of tape curling or wrinkling at the impedance roller and take-up guide pole. If it occurs at the impedance roller, adjust the impedance roller height. If it occurs at the take-up guide pole, adjust the A/C head inclination.
5) Vary the FM envelope output level and perform fine adjustments of the guide rollers.

1.6.2 A/C head height and azimuth adjustments

Incorrect A/C head height can impair audio signal-to-noise ratio when playing back a pre-recorded tape.

1. For A/C head inclination, adjust screw (A) so that small tape wrinkles are not produced at the take-up guide pole. Turn screw (A) clockwise so that the tape wrinkles are apparent with the lower flange of the take-up guide pole, then turn screw (A) counter-clockwise so that the wrinkles smooth out.
2. Adjust azimuth with screw (B).

Turn screw (B) to obtain maximum audio output.

3. For A/C head height, turn screws (A), (B) and (C) in succession by small and equal increments at a time and adjust for maximum audio output level.

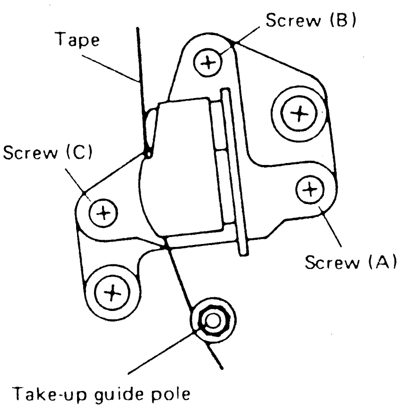

Screw (B)
Tape
Screw (C)
Screw (A)
Take-up guide pole

Fig. 1-6-4 A/C head

1.6.3 Control head phase adjustment

1. Set Tracking to Pre-Set Position by pushing both + button and – button at the same time.
2. Loosen screws (D) and (E) a little bit, then cover screw (D) with the A/CTL head position tool and set the pin of the tool into the hole next to screw (D).
3. Turn the tool counter-clockwise to shift the A/C head fully in the direction of the capstan, and then gradually turn the tool clockwise and observe the FM envelope output.
4. Set the A/C head at the point of the first output peak.

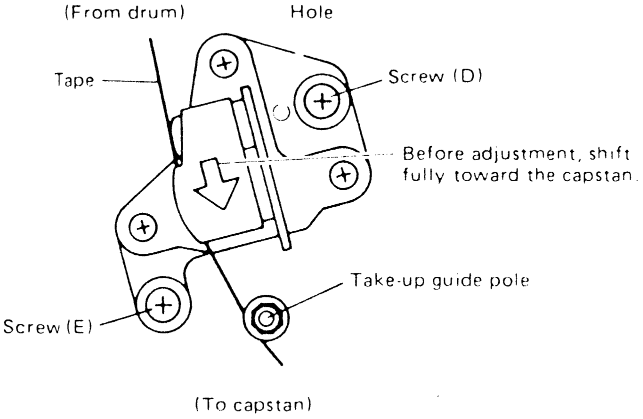

(From drum)
Hole
Tape
Screw (D)
Before adjustment, shift fully toward the capstan
Take-up guide pole
Screw (E)
(To capstan)

Fig. 1-6-5 Control head phase

1.6.4 Setscrew tightening

1. After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews located under the guide rollers while in the Stop mode.

   Note: Since the guide rollers are easily moved, use care when tightening.
2. Again perform the FM envelope confirmation.

1.6.5 Final confirmation

1. Supply a video signal and perform recording, then play back.

   Confirm that the FM envelope satisfies the specifications during playback of alignment tape MH-2.
2. Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.2.1.
3. Perform the audio PB level adjustment of the Audio circuit. Refer to section 2.4.2.
4. Perform overall confirmation of the Video circuit. Refer to section 2.3.

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Colour television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL colour bar, stairstep
9. Recording tape
10. Alignment tapes: (MH-2)

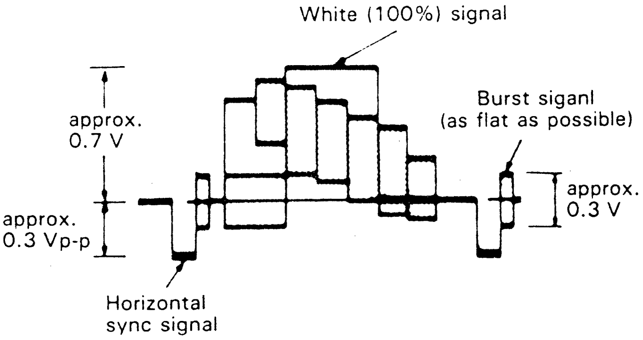

White (100%) signal
Burst siganl
(as flat as possible)
approx.
0.7 V
approx.
0.3 Vp-p
approx.
0.3 V
Horizontal
sync signal

Fig. 2-1-1 Colour bar signal of pattern generator

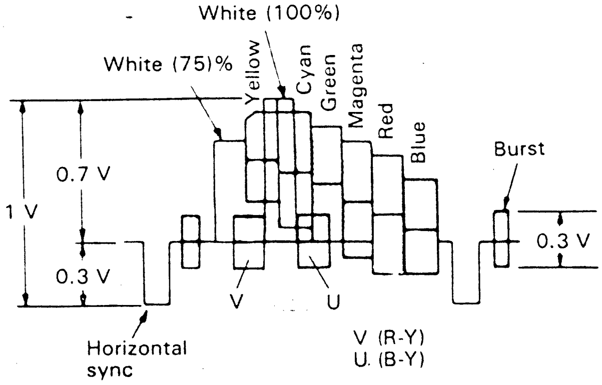

White (100%)
White (75)%
Yellow
Cyan
Green
Magenta
Red
Blue
Burst
0.7 V
1 V
0.3 V
0.3 V
V
U
Horizontal
sync
V (R-Y)
U (B-Y)

Fig. 2-1-2 Colour bar signal waveform

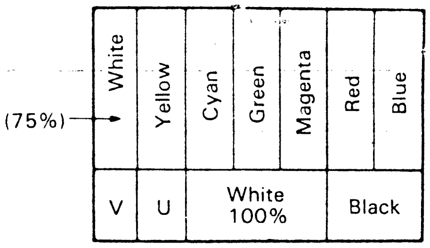

White
Yellow
Cyan
Green
Magenta
Red
Blue
(75%)
V
U
White
100%
Black

Fig. 2-1-3 Colour bar pattern

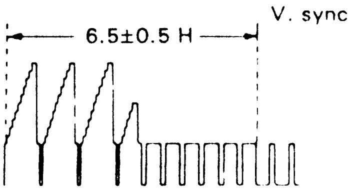
2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
Colour bar	Colour bar signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	Supply a 1 kHz sinewave as audio input signal.
MH-2 Colour bar	Play colour bar segment of MH-2 alignment tape.
MH-2 Stairstep	Play stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	Play 1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	Play RF sweep segment of MH-2 alignment tape.
Stop	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
REC ↓ (another mode)	Use blank tape, record, then play back in the mode specified.
Search	Search (FWDS and REVS) playback mode.
Slow	Slow motion playback mode.
Still	Playback then Pause.
A DUB	Audio dubbing mode.
Description	This column provides an explanation of the step, notes, adjustment values.

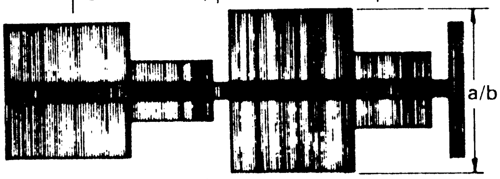
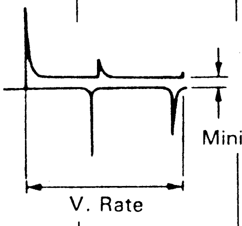
2.2 SERVO CIRCUIT (0 3 MAIN board)

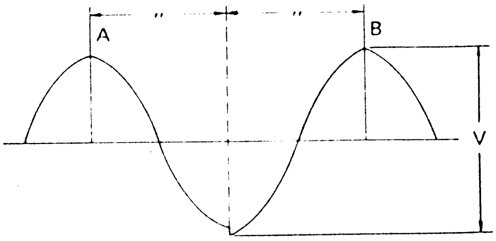
Note: Unless otherwise specified, test points and variable resistors are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	PB Switching Point	TP110 (VIDEO OUT)	R430 (PB SW POINT)	• PB • MH-2 Stairstep • Trigger slope (–)	1. Connect an oscilloscope to VIDEO OUT of the MAIN board 2. Play back the stairstep segment of MH-2 alignment tape. 3. Trigger the oscilloscope externally (– slope) with the signal from TP411 MAIN board (DRUM FF). 4. Adjust R430 to position the trigger point 6.5 ±0.5 H from V. sync.  Fig. 2-2-1
Note: Before this adjustment "Control head phase adjustment" must be completed.					
2	V. Pulse Position	MONITOR	R434	• Still • REC then PB • Colour bar	1. Record the colour bar signal, then playback. 2. In the Still mode, observe the monitor and adjust R434 (rear panel) for the minimum vertical jitter.

2.3 VIDEO CIRCUIT (0 3 MAIN board)

Note: Unless otherwise specified, test points and variable resistors are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VXO	TP209 (FSC)	R207 VXO	• PB • MH-2 Colour bar	1. Connect a frequency counter to TP209. 2. Playback the colour bar segment of MH-2 alignment tape. 3. Adjust R207 for 4.433619 MHz ± 50 Hz.
2	REC Color Level  Fig. 2-3-1	TP207 (PB Color level)	R214	• Colour bar • Rec then PB	1. Play the color bar signal of the MH-2 Alignment tape. 2. Connect oscilloscope to TP207 and measure the color play-back level. Make a note of this as level "a". 3. Use a spare tape to record and play-back a color bar signal. Make a note of this play-back level as level "b". 4. So that the ratio of b/a 0.85, adjust R214. 5. Confirm that the channel difference is within ±3 dB.
3	Noise cancel balance  Fig. 2-3-2	TP121	R112	• Colour bar • Rec then PB	1. Supply a color bar input signal and connect oscilloscope to TP121. 2. As indicated in the figure, adjust R112 for minimum DC step difference.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
4	SECAM DET	TP251 (S. DET ADJ)	L251 (1/2 fH TUNING) R257 (SECAM DET. ADJ)	• SECAM colour bar • E-E • Rec then PB	1. Connect an oscilloscoape to TP251. 2. Adjust L251 so that transition step becomes centered between "A" and "B" as shown in Fig. 2-3-3.  Set this point to center position between points "A" and "B". V = more than 5.5 Vp-p in REC V = 6.0±0.5 Vp-p in PB **Fig. 2-3-3** 3. Record then playback. 4. Adjust R257 for 6.0 ±0.5 Vp-p.
5	PB Frequency Response	MONITOR	R127	• Rec then PB • TV Broadcast	1. Record and play back a color broadcast that shows a good depiction of human facial contours. 2. Adjust R127 to obtain distinct facial features on the monitor. **Note:** R127 nearly at center position.

2.4 AUDIO CIRCUIT (0 3 MAIN board)

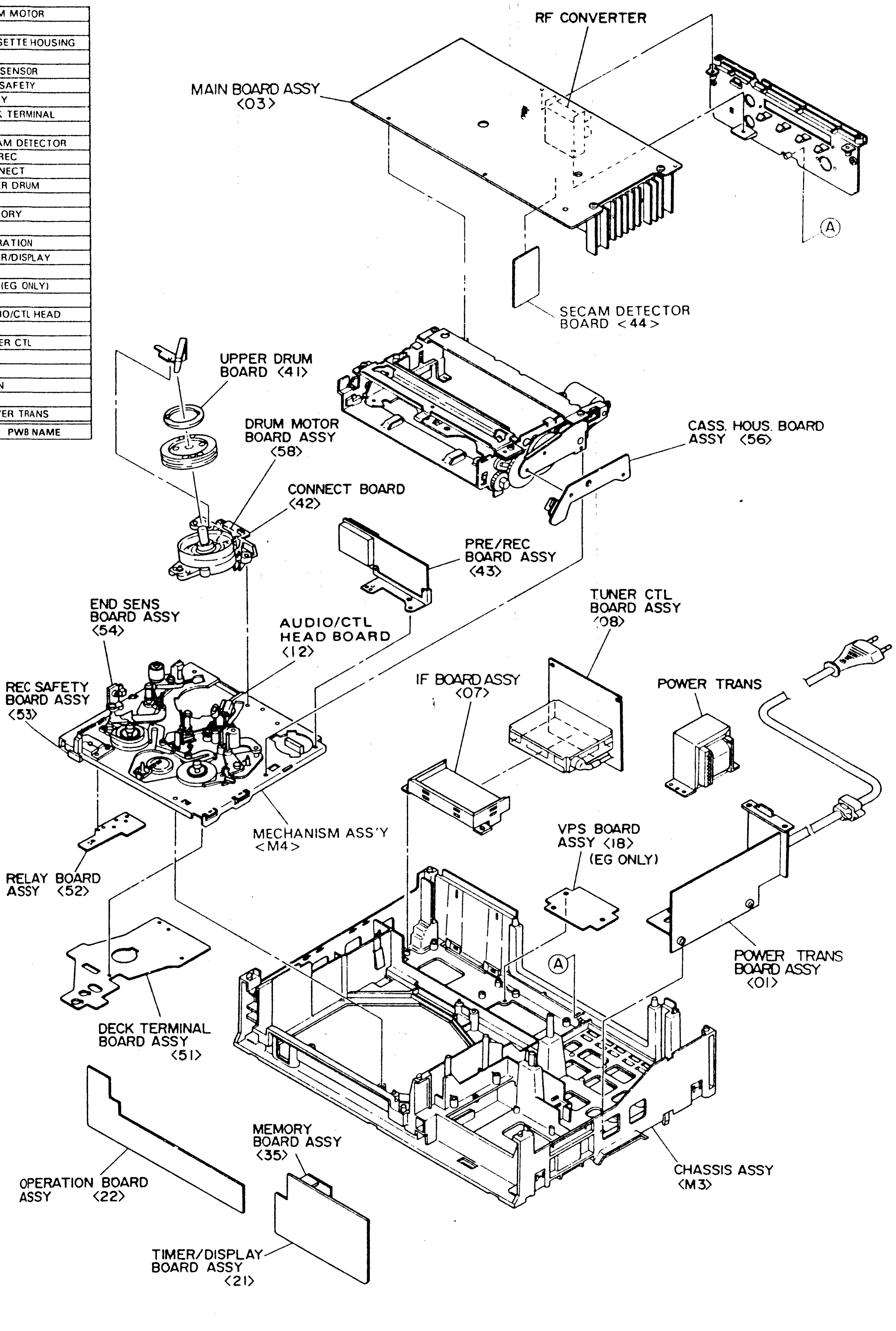
Note: Unless otherwise specified, test points and variable resistors are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31 BIAS LEVEL TP32(GND)	R41 (BIAS LEVEL)	• REC	1. Connect a digital voltmeter between TP31 and 32. 2. Set for REC mode without signal. 3. Adjust R41 for 3.5 mV ± 0.2 mVrms.
2	Audio PB Level	AUDIO OUT	R33 PB LEVEL	• REC	1. Connect a oscilloscope to AUDIO OUT. 2. Supply an audio signal (− 8 dBs/1 kHz) to AUDIO IN and record together with a VIDEO signal, then playback. 3. Adjust R5 so that the audio output level during playback becomes − 6 ± 1.0 dBs.

SECTION 3
CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD LOCATIONS

NO.	PWB NAME
58	DRUM MOTOR
56	CASSETTE HOUSING
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
44	SECAM DETECTOR
43	PRE/REC
42	CONNECT
41	UPPER DRUM
35	MEMORY
22	OPERATION
21	TIMER/DISPLAY
18	VPS (EG ONLY)
12	AUDIO/CTL HEAD
08	TUNER CTL
07	IF
03	MAIN
01	POWER TRANS


RF CONVERTER
MAIN BOARD ASSY <03>
Ⓐ
SECAM DETECTOR BOARD <44>
UPPER DRUM BOARD <41>
DRUM MOTOR BOARD ASSY <58>
CONNECT BOARD <42>
CASS. HOUS. BOARD ASSY <56>
PRE/REC BOARD ASSY <43>
END SENS BOARD ASSY <54>
AUDIO/CTL HEAD BOARD <12>
TUNER CTL BOARD ASSY <08>
REC SAFETY BOARD ASSY <53>
IF BOARD ASSY <07>
POWER TRANS
MECHANISM ASS'Y <M4>
VPS BOARD ASSY <18> (EG ONLY)
RELAY BOARD ASSY <52>
Ⓐ
POWER TRANS BOARD ASSY <01>
DECK TERMINAL BOARD ASSY <51>
MEMORY BOARD ASSY <35>
CHASSIS ASSY <M3>
OPERATION BOARD ASSY <22>
TIMER/DISPLAY BOARD ASSY <21>

3.2 GENERAL INFORMATIONS

3.2.1 Connections

Note:
Unless otherwise specified, only signal input flow is indicated.
Connection arrows indicate only signal outputs.

1 2 3 : Connector

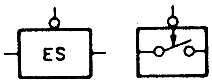
① ② ③ : Direct connection

1 2 3 : Board in connector

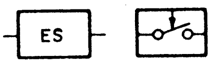
VS MS SM : Connected pattern in the board.
Abbreviations
V : Video M : Mechacon
S : Servo A : Audio
VS : Signal flow from video to servo.

3.2.2 Indications

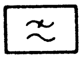
AUX : Active only at high.
$\overline{\text{AUX}}$: Active only at low.
$\bar{\text{A}}\bar{\text{U}}\bar{\text{X}}$: Active only at middle.
$\bar{\text{A}}\text{U}\bar{\text{X}}$: Active only at open.

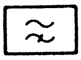


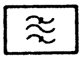
: Active only at low for electronic switch.

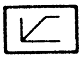


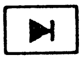
: Active only at high for electronic switch.

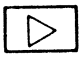

: Low pass filter.

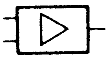

: High pass filter.


: Band pass filter.

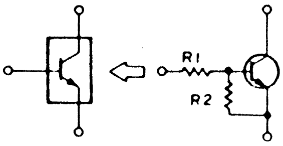

: Limiter.

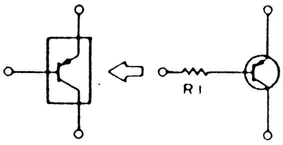

: Detector


: Amplifier.


: Mixer stage.

3.2.3 Digital transistor





DTA114T
T mark only

Note:
The digital transistor includes built in resistors.
It features small size and high reliability.
Both PNP and NPN types are available.

Uses:
Inverter, Interface, driver circuits.

3.2.4 Siganl flow in the schematic

➡ Recording signal path
⇨ Playback signal path
⇨ REC/PB signal path

3.2.5 Schematic diagram values

Unless otherwise specified.

1. All resistance values are in ohms, 1/6 W, 1/8 W, (refer to parts list).
2. All capacitance values are in μF, (P; PF).
3. All inductance values are in μH, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (– 3.8 dBs at A/V connector) during recording and playback with alignment tape (1 kHz).
8. Shaded (▨) parts are critical for safety.
   Replace only with specified parts numbers.

3.3 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAM

A	AC	: Alternating Current
	ACC	: Automatic Color Control
	ACCEL	: Acceleration
	A/CTL	: Audio/Control
	ADC	: Analog to Digital Converter
	ADD	: Adder
	ADRS	: Address
	ADJ	: Adjustment
	A DUB	: Audio Dubbing
	AE	: Audio Erase
	AEF	: Automatic Editing Function
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AGC	: Automatic Gain Control
	AH	: Audio Head
	AL	: After Loading
	ALC	: Automatic Light Compensation Automatic Level Control
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Pedestal Control Automatic Phase Control
	APL	: Average Picture Level
	A/S/M	: Audio/Servo/Mechacon
	ASS'Y	: Assembly
	ATT	: Attenuator
	AUD	: Audio
	AUTO	: Automatic
	AUX	: Auxiliary
B	B	: Base
	BAL	: Balance
	BATT	: Battery
	BFP	: Burst Flag Pulse
	BIT	: Binary Digit
	BLK	: Black, Blanking
	BLU	: Blue
	BILING	: Bilingual
	BPF	: Bandpass Filter
	BRK	: Brake
	BRN	: Brown
	BT	: Band Tuning
	BUFF	: Buffer
	BW or B/W	: Black and White
C	C	: Capacitance, Collector, Color
	CAP	: Capstan, Capacitor
	CAR	: Carrier
	CARR	: Carrier
	CASS	: Cassette
	CCD	: Charge Coupled Device
	CCT	: Circuit
	CD	: Count Down
	CE	: Chip Enable
	CF	: Ceramic Filter
	CH	: Channel
	CHG	: Charge
	CHROMA	: Chrominance
	CLK	: Clock
	CLR	: Clear
	CMD	: Command
	CNT	: Count, Counter
	COL	: Color
	COM	: Common
	COMB	: Combination Comb Filter
	COMP	: Comparator Composite Compensation
	CONN	: Connector
	CONV	: Converter
	CP	: Circuit Protector Clamp Pulse
	CPC	: Capstan Phase Control
	CTL	: Control
D	D	: Drum, Digital, Diode, Drain
	DAC	: Digital to Analog Converter
	dB	: Decibel
	DC	: Direct Current
	DEC	: Decoder
	DEMOD	: Demodulator
	DEMUX	: Demultiplexer
	DET	: Detector
	DEV	: Deviation
	DIF	: Differential
	DISCR	: Discriminator
	DL	: Delay Line
	DOC	: Dropout Compensator
	DOD	: Drop Out Detector
	DPC	: Drum Phase Control
E	E	: Edit, Emitter
	E-E	: Electric to Electric
	EF	: Emitter-Follower
	EMP	: Emphasis
	EN	: Enable
	ENC	: Encoder
	ENV	: Envelope
	EP	: Extended Play
	EQ	: Equalizer
	ES	: Electronic Switch
	ESNS	: End Sensor
	EXP	: Expander
	EXT	: External
F	F	: Farad, Fuse
	F ADV	: Frame Advance
	FDP	: Fluorescent Display Panel
	FE	: Full Erase
	FET	: Field Effect Transistor
	FF	: Fast Forward Flipflop
	FG	: Frequency Generator
	FM	: Frequency Modulation
	FMA	: FM Audio
	FR	: Full Recording, Frame, Fusible Resistor
	FREQ	: Frequency
	F-V CONV	: Frequency to Voltage Converter
	FWD	: Forward
	FWD S	: Forward Search
G	G	: Green, Gate, Grid
	GEN	: Generator
	GND	: Ground
	GRN	: Green
	GRY	: Gray
H	H	: High, Henry, Hour
	HG	: Hall Generator
	HPF	: Highpass Filter
	Hz	: Herz
I	IC	: Integrated Circuit
	ID	: Identification (Pulse)
	IF	: Intermediate Frequency
	IFR	: Infrared
	IFT	: Intermediate Frequency Transformer
	IND	: Indicator
	INH	: Inhibit
	INS	: Insert
	INT	: Internal, Interrupt
	INV	: Inverter
	I/O	: Input/Output
	IR	: Infrared
L	L	: Low, Left
	LIM	: Limiter
	LIN	: Linearity
	LOAD	: Loading (Cassette)
	LP	: Long Play
	LPF	: Lowpass Filter

M	M	Motor, Mega
	MAX	Maximum
	MDA	Motor Drive Amplifier
	MECHACON	Mechanism Control
	MIC	Microphone
	MIN	Minimum
	MIX	Mixer, Mixing
	MMV	Monostable Multivibrator
	MOD	Modulation, Modulator
	MODEM	Modulator-Demodulator
	MON	Monitor
	MPX	Multiplexer, Multiplex
	MS	Mode Select
N	NAND	Not-And
	NC	Not Connected, Normally Closed
	NFB	Negative Feedback
	NLN	Non-Linear
	NO	Normally Open
	NOR	Normal, Not-Or
	NR	Noise Reduction
O	OP	Operation
	OPAMP	Operational Amplifier
	ORN	Orange
	OSC	Oscillator
P	PB	Playback
	PC	Photocoupler, Pulse Counter
	PCM	Pulse Code Modulation
	PG	Pulse Generator
	PGM	Program
	PI	Photo Interrupter
	PIF	Picture Intermediate Frequency
	PLA	Programmable Logic Array
	PLL	Phase Locked Loop
	POS	Position
	p-p	Peak-to-Peak
	PREAMP	Preamplifier
	P/S	Pause/Still
	PSC	Pulse Swallowing Control
	PU	Pickup
	PUT	Programmable Unijunction Transistor
	PWM	Pulse Width Modulation
	PWR	Power
Q	Q	Quality Factor
R	R	Red, Right
	RA	Resistor Array
	RAE	Random Access Enable
	RAM	Random Access Memory
	REC	Recording
	REF	Reference
	REG	Regulated, Regulator
	REM	Remote
	REMOCON	Remote Control (Unit)
	REV	Reverse
	REV S	Reverse Search
	REW	Rewind
	R/P	Record/Playback
	RPT	Repeat
	RST	Reset
	RT	Rotary Transformer
	RUN	Running
	RY	Relay
S	SAW	Sawtooth, Surface Acoustic Wave
	SC	Subcarrier, Simulcast
	SCH	Search
	SEL	Select, Selector
	SENS	Sensor
	SEP	Separator
	SF	Source Follower
	SFF	Short Fast Forward
	SIF	Sound Intermediate Frequency
	SHARP	Sharpness
	SN	Signal to Noise Ratio
	SOL	Solenoid
	SP	Standard Play
	SREV	Search Reverse
	SREW	Short Rewind
	S/S	Slow/Still
	SSG	Sync Signal Generator
	SSNS	Start Sensor
	STD	Strobe Data, Standard
	SUP	Supply
	SW	Switch
	SWD	Switched
	SYNC	Synchronization
T	TF	Thermal Fuse
	TIM	Timing
	TK	Tracking
	TNR	Tuner
	TP	Test Point
	TPZD	Trapezoid
	TR	Transistor, Trimmer
	TRANS	Transformer
	TU	Take-up
U	UL	Unloading
	UNREG	Unregulated
	UNSW	Unswitched
V	V	Vertical, Volt
	VCO	Voltage Controlled Oscillator
	VD	Vertical Drive
	VIF	Video Intermediate Frequency
	VLT	Violet
	VR	Variable Resistor
	VS	Video and Sync
	V/T	Video/Television
	V/U	VHF/UHF
	VXO	Variable Crystal Oscillator
W	W	Watt
	W & D	White and Dark
	WHT	White
X	XTAL	Crystal
Y	Y	Luminance
	YEL	Yellow

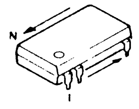
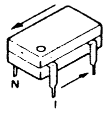
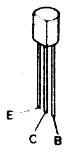
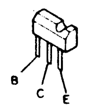
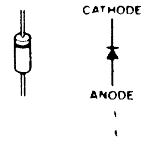
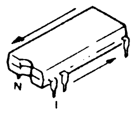
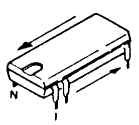
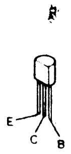
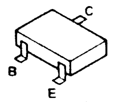
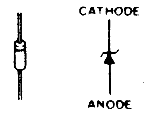
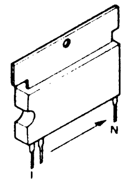
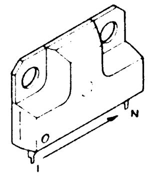
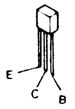
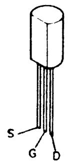
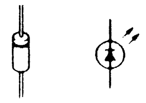
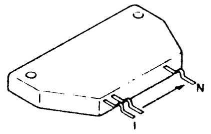
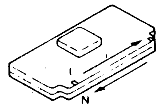
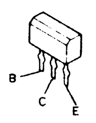
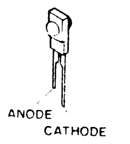
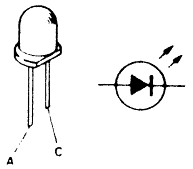
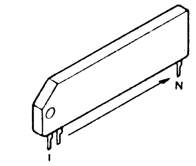
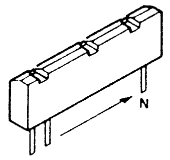
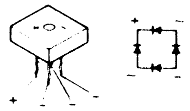
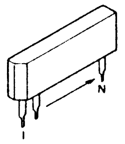
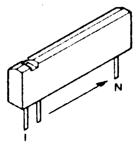
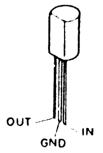
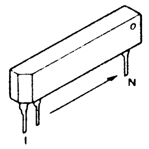
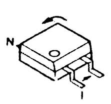
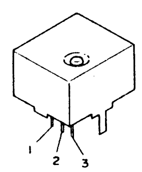
3.4 MAIN TYPES OF ACTIVE AND PACKAGE CIRCUITS

INTEGRATED CIRCUIT		
	NAME	L
A	AN1358	1B
	AN3380K	2A
B	BA6222	3A
	BA6259N	5B
	BA7007	6B
	BA7751ALS	5A
	BU4066B	2B
G	GP1U501	8B
H	HD49703NT	2A
	HD49722NT	1A
I	IC-PST523H-2	7A
L	LA7910	7B
M	MN1220	2A
	MSM6967RS	8A
	M51496P	2B
	M5278L05	7A
	M5278L56	7A
	M54647L	3B
	M50731-623SP	
P	PB20166C	4B
	PU22046A	4B
S	STK5481	4A
T	TA7374P	8B
U	UPD75216ACW-089	

TRANSISTOR		
	NAME	L
D	DTA114ES	3C
	DTA124ES	3C
	DTC114YS	3C
	DTC124ES	3C
	DTC144ES	3C
	DTC144WS	3C
P	PN268R	4D
2SA	2SA1309	3C
	2SA720	2C
	2SA933	3C
2SB	2SB641	1D
	2SB810	3C
2SC	2SC1740	3C
	2SC2021	1D
	2SC2636	1D
	2SC3311	3C
	2SC3327	3C
	2SC3399	3C
	2SC536	3C
2SD	2SD1450	3C
	2SD637	1D

DIODE		
	NAME	L
H	HZS4.3EB2	2E
	HZS7.5EB2	2E
	HZT33-02	2E
	HZ30-2	2E
M	MA165	1E
	MTZ11B	2E
	MTZ15B	2E
	MTZ5.1	2E
	MA27TB	2E
	MA27W(A)	2E
R	RD10ES-T1B2	2E
	RD9.1ESB2	2E
S	SLR-34MC3F	4E
	SLR-34VC3F	4E
	S4VB10-F2	5E
	1SS292	1E
	1SS132	1E
	1SS133	1E
	11E2	1E

Note: FOR INSTANCE, AN1358 →
1B: SEE COLUMN 1, LINE B

	Integrated Circuit		Transistor		Diode
	A	B	C	D	E
1					 CATHODE ANODE
2					 CATHODE ANODE
3					
4				 ANODE CATHODE	
5					
6					
7					
8					
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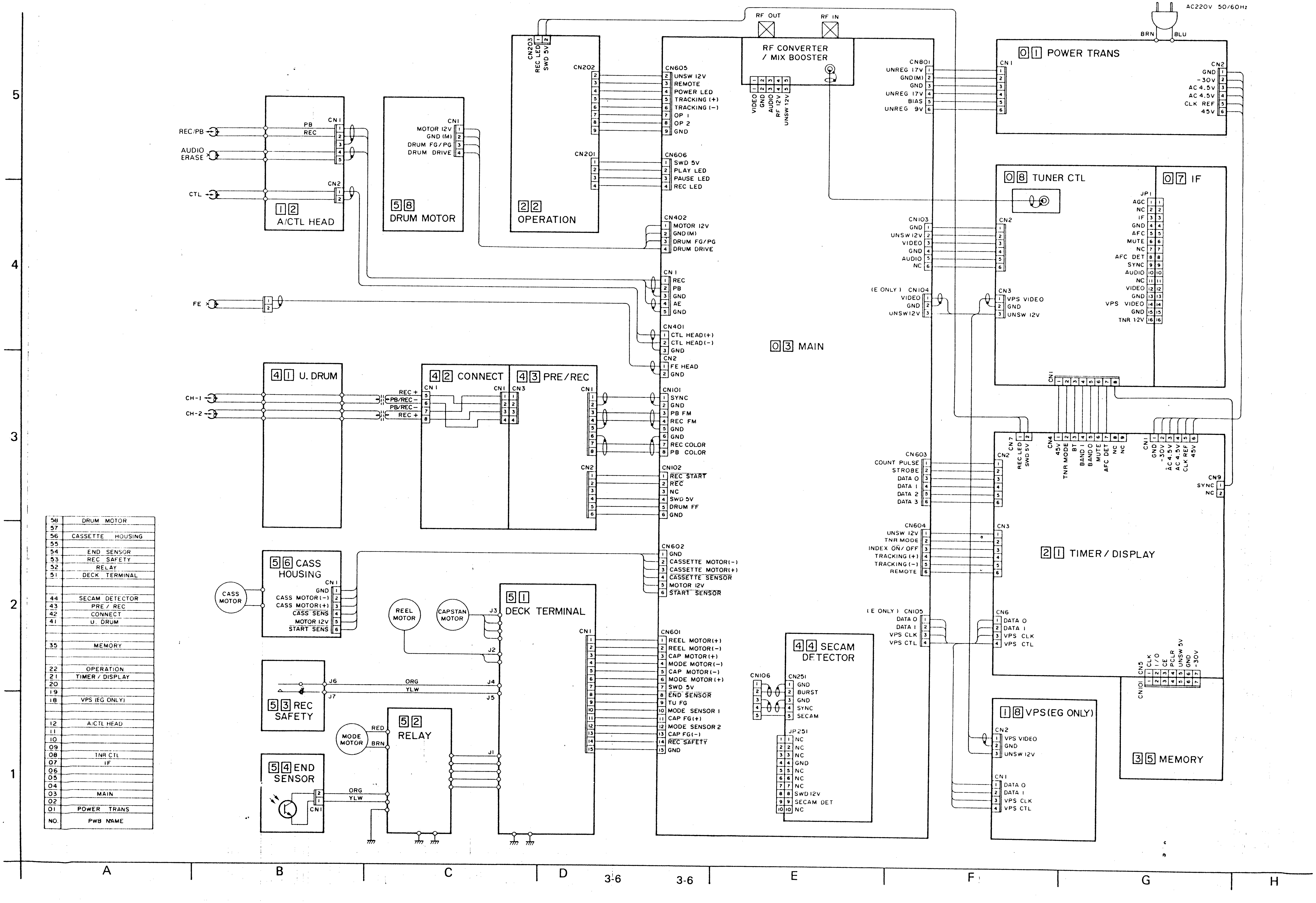
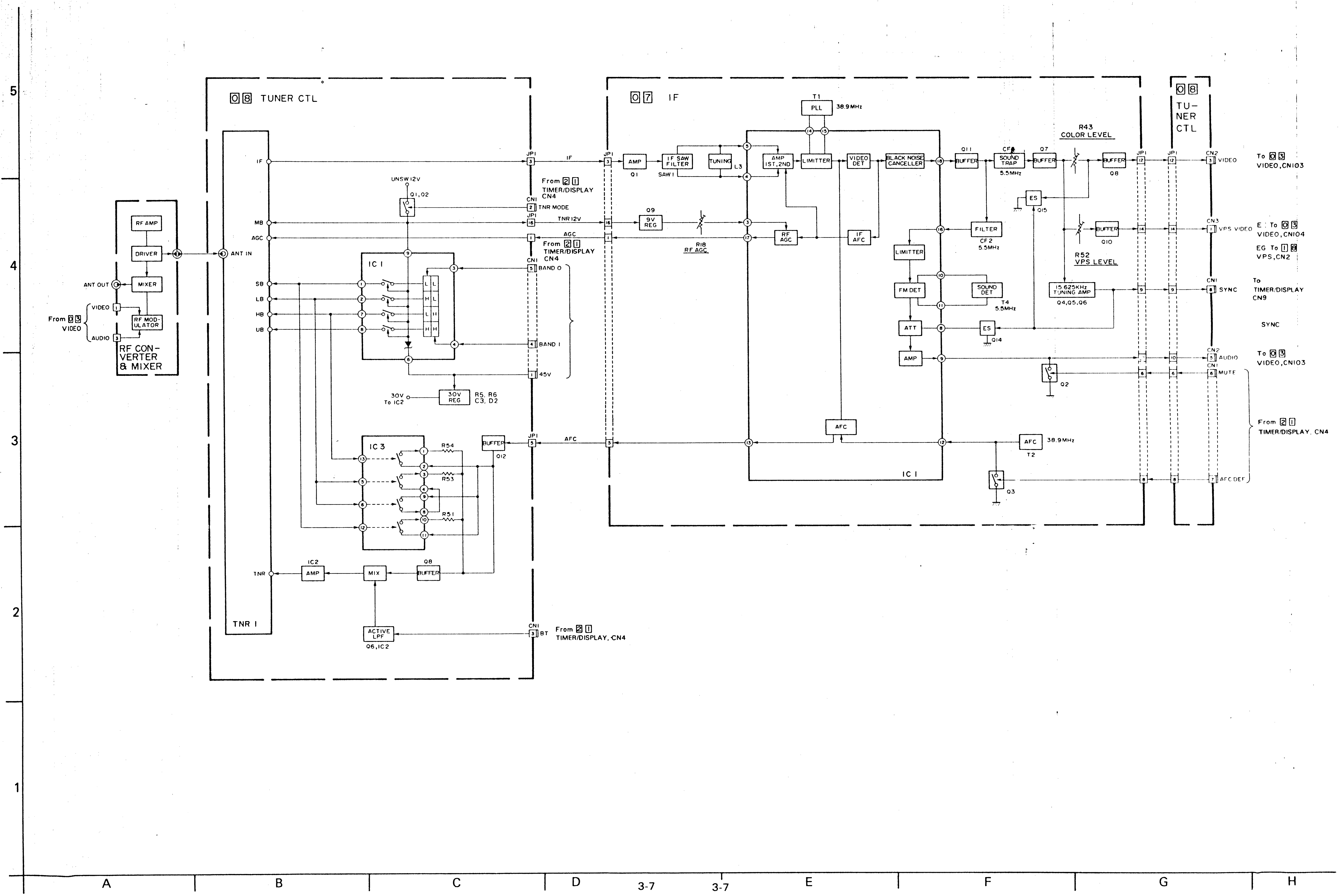
3.5 BOARD INTERCONNECTION DIAGRAM



AC220V 50/60Hz
BRN
BLU
01 POWER TRANS
CN1
CN2
GND
-30V
AC 4.5V
AC 4.5V
CLK REF
45V
RF OUT
RF IN
RF CONVERTER / MIX BOOSTER
VIDEO
GND
AUDIO
RF 12V
UNSW 12V
CN801
UNREG 17V
GND(M)
GND
UNREG 17V
BIAS
UNREG 9V
03 MAIN
08 TUNER CTL
07 IF
JP1
AGC
NC
IF
GND
AFC
MUTE
NC
AFC DET
SYNC
AUDIO
NC
VIDEO
GND
VPS VIDEO
GND
TNR 12V
CN103
GND
UNSW 12V
VIDEO
GND
AUDIO
NC
(E ONLY) CN104
VIDEO
GND
UNSW12V
CN3
VPS VIDEO
GND
UNSW 12V
CN203
REC LED
SWD 5V
CN202
CN201
22 OPERATION
CN605
UNSW 12V
REMOTE
POWER LED
TRACKING (+)
TRACKING (-)
OP 1
OP 2
GND
CN606
SWD 5V
PLAY LED
PAUSE LED
REC LED
CN402
MOTOR 12V
GND(M)
DRUM FG/PG
DRUM DRIVE
58 DRUM MOTOR
CN1
MOTOR 12V
GND (M)
DRUM FG/PG
DRUM DRIVE
12 A/CTL HEAD
REC/PB
AUDIO ERASE
CTL
PB
REC
CN1
CN2
FE
CN1
REC
PB
GND
AE
GND
CN401
CTL HEAD(+)
CTL HEAD(-)
GND
CN2
FE HEAD
GND
41 U. DRUM
CH-1
CH-2
42 CONNECT
43 PRE/REC
REC +
PB/REC -
PB/REC -
REC +
CN1
CN3
CN2
CN101
SYNC
GND
PB FM
REC FM
GND
GND
REC COLOR
PB COLOR
CN102
REC START
REC
NC
SWD 5V
DRUM FF
GND
CN7
REC LED
SWD 5V
CN4
45V
TNR MODE
BT
BAND I
BAND II
MUTE
AFC DET
NC
NC
CN1
GND
-30V
AC 4.5V
AC 4.5V
CLK REF
45V
CN9
SYNC
NC
CN603
COUNT PULSE
STROBE
DATA 0
DATA 1
DATA 2
DATA 3
CN2
CN604
UNSW 12V
TNR MODE
INDEX ON/OFF
TRACKING (+)
TRACKING (-)
REMOTE
CN3
21 TIMER/DISPLAY
(E ONLY) CN105
DATA 0
DATA 1
VPS CLK
VPS CTL
CN6
DATA 0
DATA 1
VPS CLK
VPS CTL
CN5
CLK
I/O
CE
PCLR
UNSW 5V
GND
-30V
CN101
35 MEMORY
18 VPS (EG ONLY)
CN2
VPS VIDEO
GND
UNSW 12V
CN1
DATA 0
DATA 1
VPS CLK
VPS CTL
CN602
GND
CASSETTE MOTOR(-)
CASSETTE MOTOR(+)
CASSETTE SENSOR
MOTOR 12V
START SENSOR
56 CASS HOUSING
CASS MOTOR
CN1
GND
CASS MOTOR(-)
CASS MOTOR(+)
CASS SENS
MOTOR 12V
START SENS
REEL MOTOR
CAPSTAN MOTOR
51 DECK TERMINAL
J1
J2
J3
J4
J5
J6
J7
ORG
YLW
53 REC SAFETY
52 RELAY
MODE MOTOR
RED
BRN
54 END SENSOR
CN1
ORG
YLW
CN601
REEL MOTOR(+)
REEL MOTOR(-)
CAP MOTOR(+)
MODE MOTOR(-)
CAP MOTOR(-)
MODE MOTOR(+)
SWD 5V
END SENSOR
TU FG
MODE SENSOR 1
CAP FG(+)
MODE SENSOR 2
CAP FG(-)
REC SAFETY
GND
44 SECAM DETECTOR
CN106
CN251
GND
BURST
GND
SYNC
SECAM
JP251
NC
NC
NC
GND
NC
NC
NC
SWD 12V
SECAM DET
NC
5
4
3
2
1
A
B
C
D
E
F
G
H

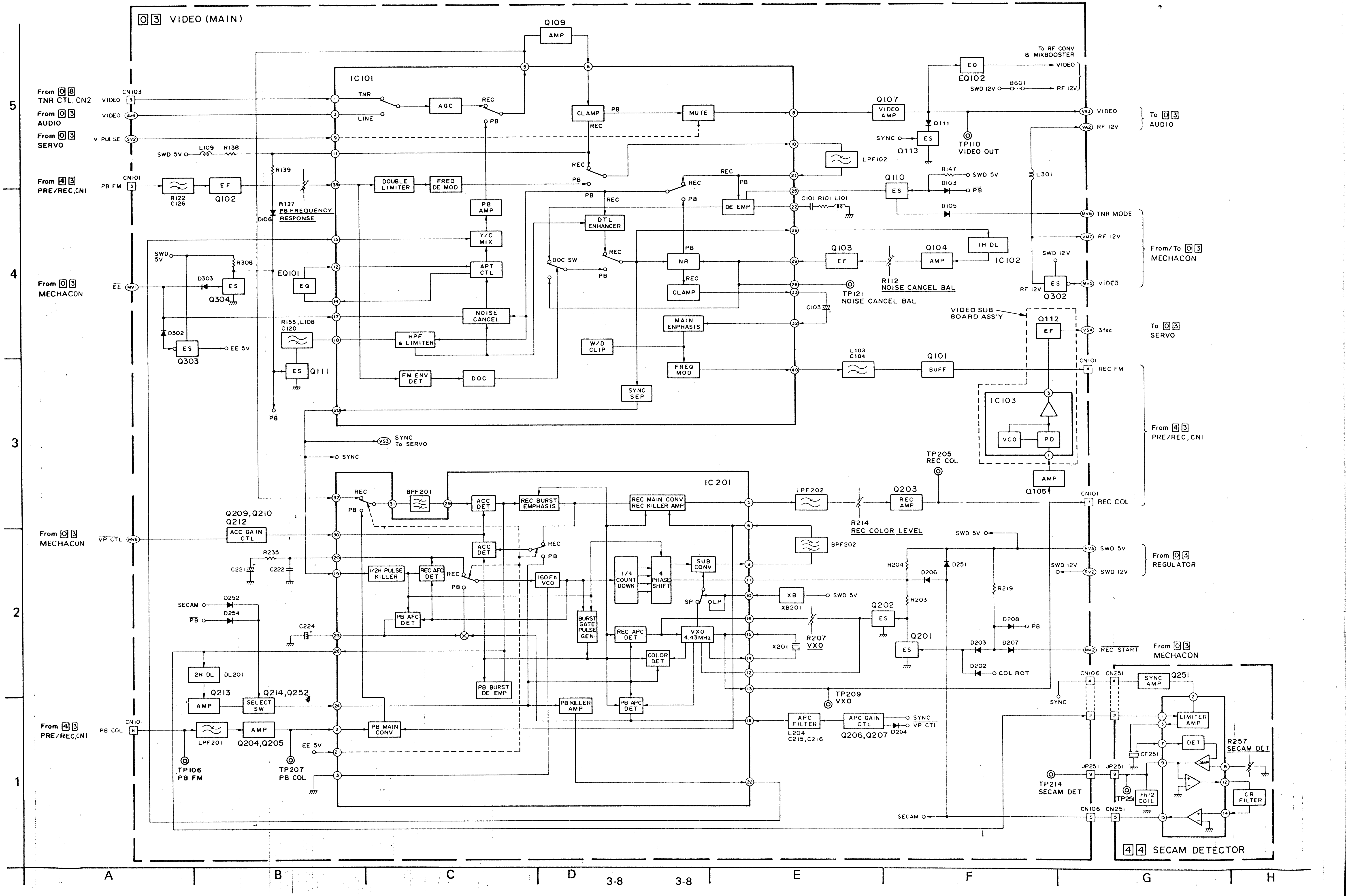
58	DRUM MOTOR
57	
56	CASSETTE HOUSING
55	
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
44	SECAM DETECTOR
43	PRE / REC
42	CONNECT
41	U. DRUM
35	MEMORY
22	OPERATION
21	TIMER / DISPLAY
20	
19	
18	VPS (EG ONLY)
12	A/CTL HEAD
11	
10	
09	
08	TNR CTL
07	IF
06	
05	
04	
03	MAIN
02	
01	POWER TRANS
NO.	PWB NAME

3.6 IF AND TUNER CTL BLOCK DIAGRAMS



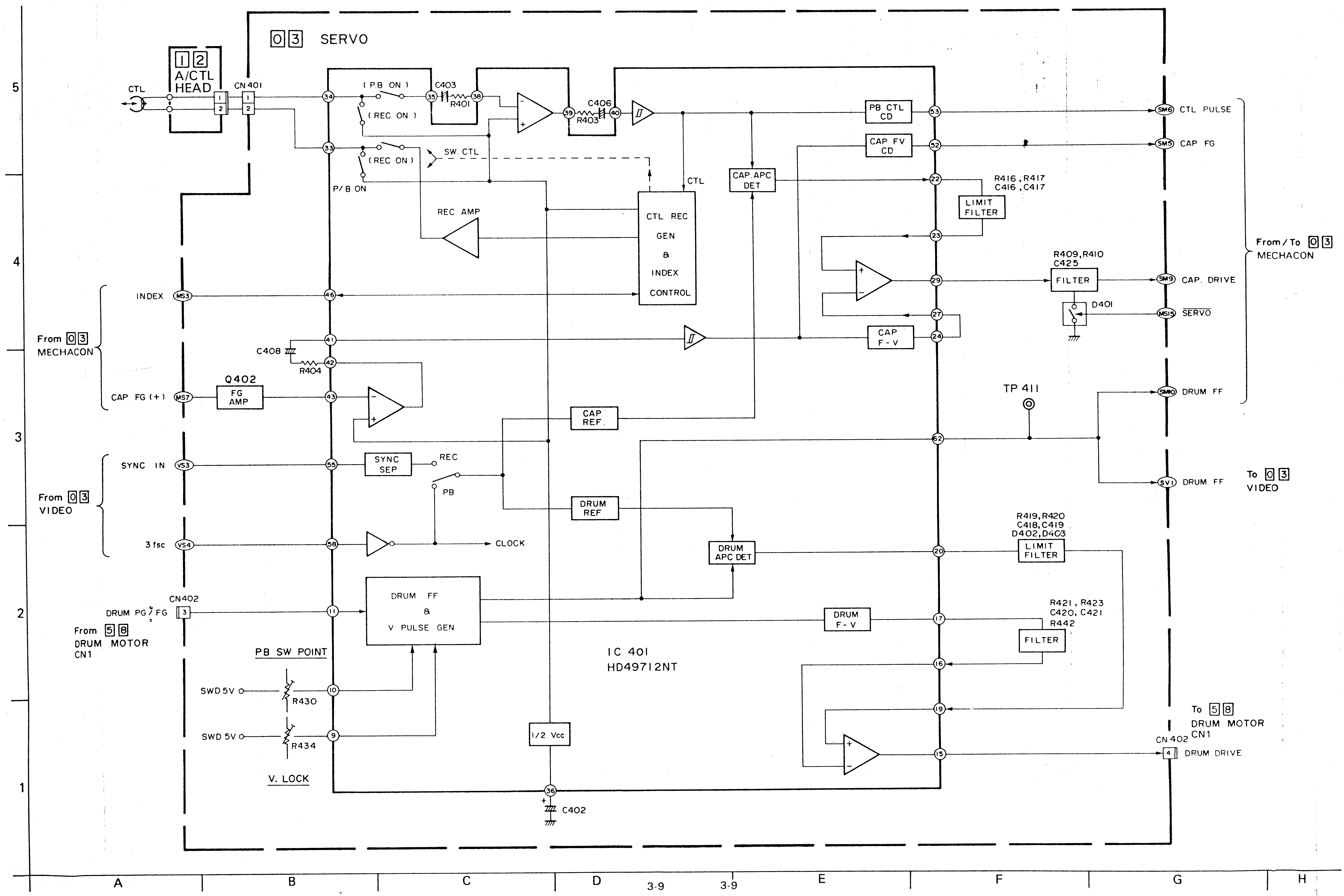
08 TUNER CTL
07 IF
08 TU-NER CTL
RF AMP
DRIVER
MIXER
RF MOD-ULATOR
RF CON-VERTER & MIXER
ANT OUT
VIDEO
AUDIO
From 03 VIDEO
ANT IN
IF
MB
AGC
SB
LB
HB
UB
TNR
TNR 1
UNSW 12V
Q1, Q2
IC 1
IC 3
R54
R53
R51
BUFFER
Q12
30V REG
R5, R6 C3, D2
30V To IC2
IC2
AMP
MIX
Q8
BUFFER
ACTIVE LPF
Q6, IC2
JP1
CN1
TNR MODE
TNR 12V
From 21 TIMER/DISPLAY CN4
BAND 0
BAND 1
45V
AFC
BT
From 21 TIMER/DISPLAY, CN4
Q1
AMP
IF SAW FILTER
SAW1
TUNING
L3
T1
PLL
38.9MHz
AMP 1ST, 2ND
LIMITTER
VIDEO DET
BLACK NOISE CANCELLER
Q9
9V REG
R18 RF AGC
RF AGC
IF AFC
LIMITTER
FM DET
ATT
AMP
SOUND DET
T4 5.5MHz
AFC
IC 1
Q11
BUFFER
CF1
SOUND TRAP
5.5MHz
Q7
BUFFER
R43 COLOR LEVEL
BUFFER
Q8
ES
Q15
FILTER
CF2 5.5MHz
BUFFER
Q10
R52 VPS LEVEL
15.625KHz TUNING AMP
Q4, Q5, Q6
ES
Q14
Q2
AFC
38.9MHz
T2
Q3
CN2 VIDEO
To 03 VIDEO, CN103
CN3 VPS VIDEO
E: To 03 VIDEO, CN104
EG To 18 VPS, CN2
CN1 SYNC
To TIMER/DISPLAY CN9
SYNC
CN2 AUDIO
To 03 VIDEO, CN103
CN1 MUTE
From 21 TIMER/DISPLAY, CN4
AFC DEF
A
B
C
D
E
F
G
H
1
2
3
4
5

3.7 VIDEO BLOCK DIAGRAM



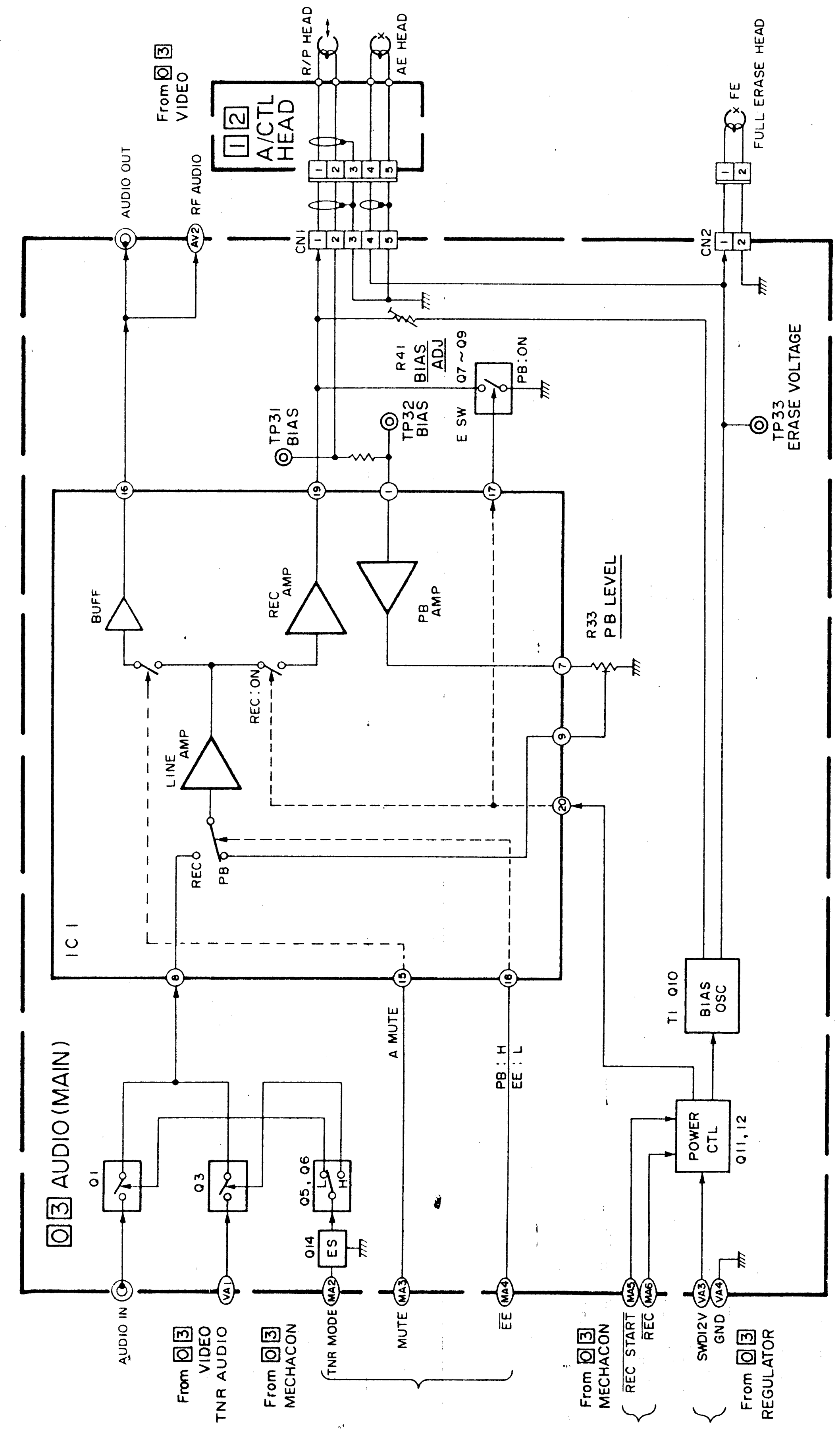
03 VIDEO (MAIN)
IC101
IC102
IC103
IC201
Q109 AMP
From 08 TNR CTL, CN2
From 03 AUDIO
From 03 SERVO
From 43 PRE/REC, CN1
From 03 MECHACON
From 03 MECHACON
From 43 PRE/REC, CN1
CN103 VIDEO
VIDEO
V PULSE
SWD 5V
L109
R138
CN101 PB FM
R122 C126
EF Q102
R139
R127 PB FREQUENCY RESPONSE
D106
TNR
LINE
AGC
REC
PB
DOUBLE LIMITER
FREQ DE MOD
PB AMP
Y/C MIX
APT CTL
EQ EQ101
R308
D303
ES Q304
EE
D302
ES Q303
EE 5V
R155, L108 C120
HPF & LIMITER
ES Q111
FM ENV DET
DOC
NOISE CANCEL
CLAMP
MUTE
DTL ENHANCER
DOC SW
DE EMP
NR
SYNC SEP
W/D CLIP
MAIN ENPHASIS
FREQ MOD
C101 R101 L101
LPF102
Q107 VIDEO AMP
EQ EQ102
To RF CONV & MIXBOOSTER VIDEO
SWD 12V B601 RF 12V
D111
SYNC ES Q113
TP110 VIDEO OUT
Q110 ES
R147 SWD 5V
D103 PB
D105
L301
TNR MODE
RF 12V
Q103 EF
Q104 AMP
1H DL
R112 NOISE CANCEL BAL
TP121 NOISE CANCEL BAL
C103
SWD 12V
RF 12V ES Q302
VIDEO
VIDEO SUB BOARD ASS'Y
Q112 EF
3fsc
L103 C104
Q101 BUFF
CN101 REC FM
VCO
PD
AMP Q105
To 03 AUDIO
From/To 03 MECHACON
To 03 SERVO
From 43 PRE/REC, CN1
SYNC To SERVO
SYNC
PB
BPF201
ACC DET
REC BURST EMPHASIS
REC MAIN CONV REC KILLER AMP
Q209, Q210 Q212 ACC GAIN CTL
VP CTL
R235
C221
C222
1/2H PULSE KILLER
REC AFC DET
PB AFC DET
160Fh VCO
BURST GATE PULSE GEN
1/4 COUNT DOWN
4 PHASE SHIFT
SUB CONV
SP LP
XB XB201
REC APC DET
VXO 4.43MHz
COLOR DET
PB BURST DE EMP
PB KILLER AMP
PB APC DET
PB MAIN CONV
SECAM D252
PB D254
C224
2H DL DL201
AMP Q213
SELECT SW Q214, Q252
LPF201
AMP Q204, Q205
CN101 PB COL
EE 5V
TP106 PB FM
TP207 PB COL
LPF202
BPF202
TP205 REC COL
Q203 REC AMP
R214 REC COLOR LEVEL
CN101 REC COL
SWD 5V
R204
D206
D251
R219
R203
Q202 ES
R207 VXO
X201
Q201 ES
D208 PB
D203 D207
D202 COL ROT
REC START
SWD 5V
SWD 12V
From 03 REGULATOR
From 03 MECHACON
TP209 VXO
APC FILTER L204 C215, C216
APC GAIN CTL Q206, Q207
SYNC VP CTL D204
CN106 CN251
SYNC AMP Q251
LIMITER AMP
DET
CF251
R257 SECAM DET
JP251
TP214 SECAM DET
TP251
Fh/2 COIL
CR FILTER
SECAM
44 SECAM DETECTOR
A B C D E F G H
1 2 3 4 5

3.8 SERVO BLOCK DIAGRAM

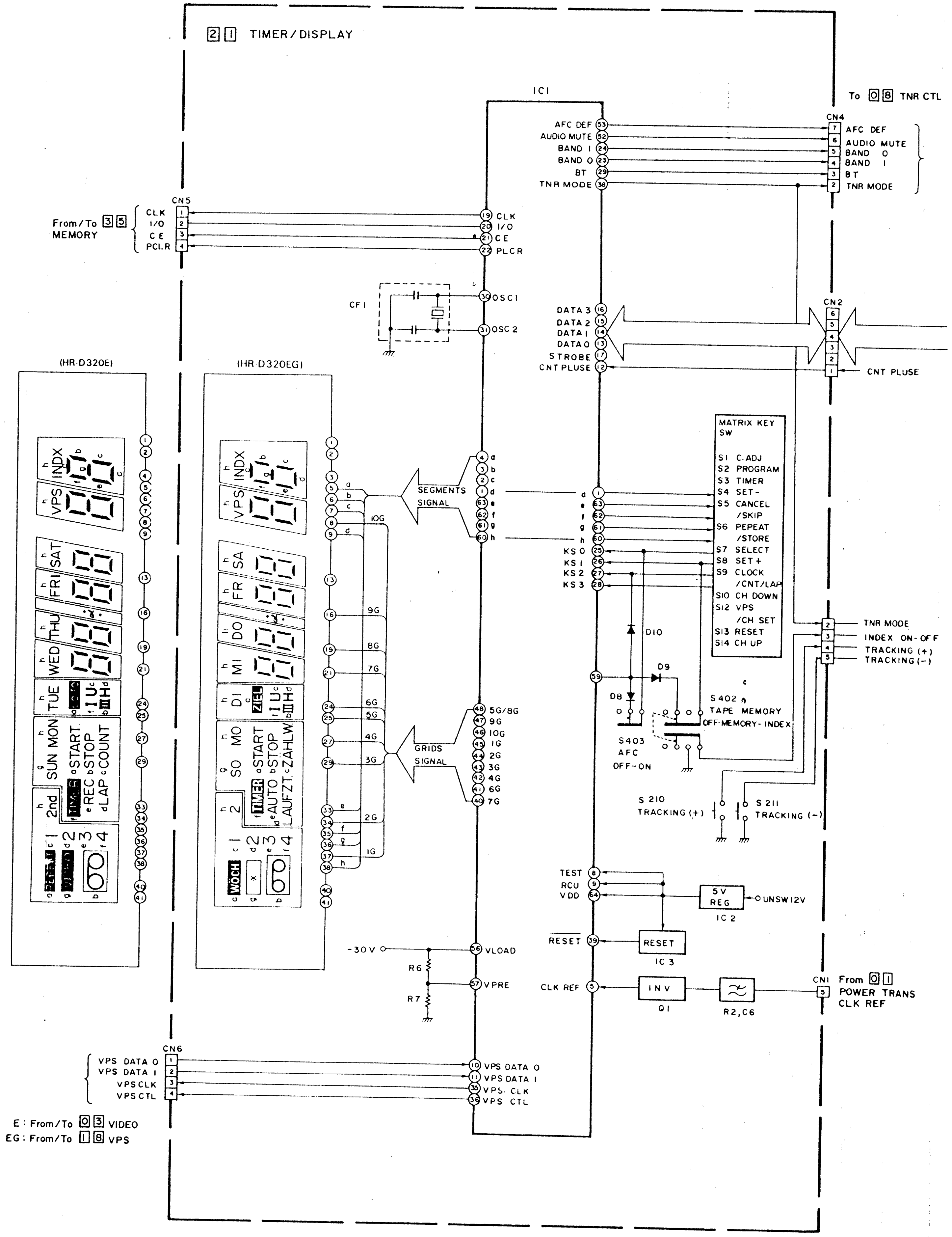


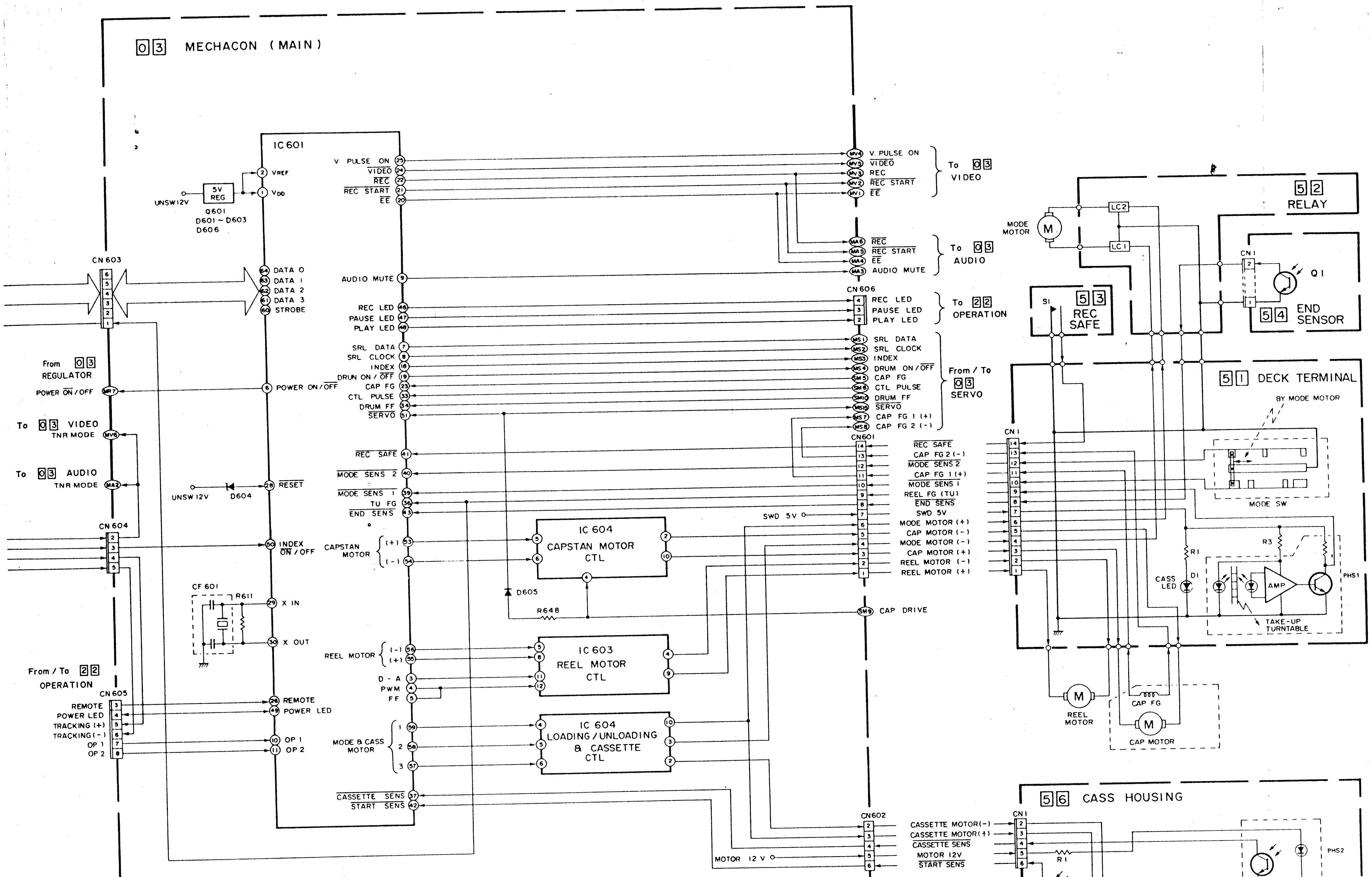
03 SERVO
12 A/CTL HEAD
CTL
CN401
(P.B ON)
(REC ON)
(REC ON)
P/B ON
SW. CTL
C403
R401
C406
R403
CTL
REC AMP
CTL REC GEN & INDEX CONTROL
PB CTL CD
CAP FV CD
CAP. APC DET
R416, R417
C416, C417
LIMIT FILTER
R409, R410
C425
FILTER
D401
CAP F-V
CTL PULSE
CAP FG
CAP. DRIVE
SERVO
DRUM FF
DRUM FF
From/To 03 MECHACON
To 03 VIDEO
INDEX
From 03 MECHACON
C408
R404
Q402
FG AMP
CAP FG (+)
CAP REF.
TP 411
SYNC IN
From 03 VIDEO
3 fsc
SYNC SEP
REC
PB
CLOCK
DRUM REF
DRUM APC DET
R419, R420
C418, C419
D402, D403
LIMIT FILTER
CN402
DRUM PG/FG
From 58 DRUM MOTOR CN1
DRUM FF & V PULSE GEN
DRUM F-V
R421, R423
C420, C421
R442
FILTER
IC 401
HD49712NT
PB SW POINT
SWD 5V
R430
SWD 5V
R434
V. LOCK
1/2 Vcc
C402
To 58 DRUM MOTOR CN1
CN 402
DRUM DRIVE
MS3
MS7
VS3
VS4
SM6
SM5
SM9
MS15
SM10
SV1
34
33
35
38
39
40
53
52
22
23
29
27
24
46
41
42
43
62
55
58
20
11
17
16
19
10
9
15
36
1
2
3
4
5
A
B
C
D
E
F
G
H

3.9 AUDIO BLOCK DIAGRAM


From 03 VIDEO
12 A/CTL HEAD
R/P HEAD
AE HEAD
FE FULL ERASE HEAD
AUDIO OUT
RF AUDIO
AV2
CN1
CN2
R41 BIAS ADJ
Q7~Q9
PB:ON
TP31 BIAS
TP32 BIAS
E SW
TP33 ERASE VOLTAGE
BUFF
REC AMP
PB AMP
R33 PB LEVEL
REC:ON
LINE AMP
REC
PB
IC 1
A MUTE
PB : H
EE : L
T1 Q10
BIAS OSC
POWER CTL
Q11, 12
03 AUDIO (MAIN)
Q1
Q3
Q5, Q6
L
H
Q14
ES
AUDIO IN
VA1
MA2
MA3
MA4
MA5
MA6
VA3
VA4
From 03 VIDEO TNR AUDIO
From 03 MECHACON
TNR MODE
MUTE
EE
From 03 MECHACON
REC START
REC
SWD12V
GND
From 03 REGULATOR

3.10 MECHANISM CONTROL AND TIMER/DISPLAY BLOCK DIAGRAMS


21 TIMER / DISPLAY
IC1
To 08 TNR CTL
CN4
AFC DEF
AUDIO MUTE
BAND 1
BAND 0
BT
TNR MODE
AFC DEF
AUDIO MUTE
BAND 0
BAND 1
BT
TNR MODE
From/To 35 MEMORY
CN5
CLK
I/O
CE
PCLR
CF1
OSC1
OSC2
DATA 3
DATA 2
DATA 1
DATA 0
STROBE
CNT PLUSE
CN2
CNT PLUSE
(HR D320E)
(HR D320EG)
INDX
VPS
SAT
FRI
THU
WED
TUE
SUN MON
START
STOP
REC
LAP
COUNT
2nd
TIMER
AUTO
SA
FR
DO
MI
DI
SO MO
ZAHLW
LAUFZT
WOCH
ZIEL
SEGMENTS SIGNAL
GRIDS SIGNAL
5G/8G
9G
10G
1G
2G
3G
4G
6G
7G
MATRIX KEY SW
S1 C.ADJ
S2 PROGRAM
S3 TIMER
S4 SET-
S5 CANCEL /SKIP
S6 PEPEAT /STORE
S7 SELECT
S8 SET+
S9 CLOCK /CNT/LAP
S10 CH DOWN
S12 VPS /CH SET
S13 RESET
S14 CH UP
KS0
KS1
KS2
KS3
D10
D9
D8
S402 TAPE MEMORY OFF-MEMORY-INDEX
S403 AFC OFF-ON
TNR MODE
INDEX ON-OFF
TRACKING (+)
TRACKING (-)
S210 TRACKING (+)
S211 TRACKING (-)
TEST
RCU
VDD
5V REG
IC2
UNSW12V
RESET
IC3
CLK REF
INV
Q1
R2,C6
CN1 From 01 POWER TRANS CLK REF
-30V
R6
R7
VLOAD
VPRE
CN6
VPS DATA 0
VPS DATA 1
VPS CLK
VPS CTL
E : From/To 03 VIDEO
EG : From/To 18 VPS


03 MECHACON (MAIN)
IC601
V PULSE ON
VIDEO
REC
REC START
EE
VREF
VDD
5V REG
UNSW12V
Q601
D601 ~ D603
D606
CN603
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
AUDIO MUTE
REC LED
PAUSE LED
PLAY LED
SRL DATA
SRL CLOCK
INDEX
DRUM ON / OFF
CAP FG
CTL PULSE
DRUM FF
SERVO
From 03 REGULATOR
POWER ON / OFF
To 03 VIDEO TNR MODE
To 03 AUDIO TNR MODE
REC SAFE
MODE SENS 2
MODE SENS 1
TU FG
END SENS
RESET
UNSW12V
D604
CN604
INDEX ON / OFF
CAPSTAN MOTOR
IC604 CAPSTAN MOTOR CTL
D605
R648
CAP DRIVE
CF601
R611
X IN
X OUT
REEL MOTOR
D - A
PWM
FF
IC603 REEL MOTOR CTL
From / To 22 OPERATION
CN605
REMOTE
POWER LED
TRACKING (+)
TRACKING (-)
OP 1
OP 2
MODE & CASS MOTOR
IC604 LOADING / UNLOADING & CASSETTE CTL
CASSETTE SENS
START SENS
To 03 VIDEO
V PULSE ON
VIDEO
REC
REC START
EE
To 03 AUDIO
REC
REC START
EE
AUDIO MUTE
CN606
To 22 OPERATION
REC LED
PAUSE LED
PLAY LED
From / To 03 SERVO
SRL DATA
SRL CLOCK
INDEX
DRUM ON / OFF
CAP FG
CTL PULSE
DRUM FF
SERVO
CAP FG 1 (+)
CAP FG 2 (-)
CN601
REC SAFE
CAP FG 2 (-)
MODE SENS 2
CAP FG 1 (+)
MODE SENS 1
REEL FG (TU)
END SENS
SWD 5V
MODE MOTOR (+)
CAP MOTOR (-)
MODE MOTOR (-)
CAP MOTOR (+)
REEL MOTOR (-)
REEL MOTOR (+)
CN602
CASSETTE MOTOR (-)
CASSETTE MOTOR (+)
CASSETTE SENS
MOTOR 12V
START SENS
MOTOR 12 V
52 RELAY
MODE MOTOR
LC2
LC1
53 REC SAFE
S1
CN1
Q1
54 END SENSOR
51 DECK TERMINAL
BY MODE MOTOR
CN1
MODE SW
R1
R3
CASS LED
D1
AMP
PHS1
TAKE-UP TURNTABLE
REEL MOTOR
CAP FG
CAP MOTOR
56 CASS HOUSING
CN1
R1
Q1
PHS2
CASS MOTOR

MOTOR	MODE	PINS					
		INPUT			OUTPUT		
		4	5	6	2	3	10
CASSETTE	FWD	H	L	L	H	L	O
	REV	H	L	H	L	H	O
MODE	FWD	L	H	L	H	O	L
	REV	L	H	H	L	O	H
BRAKE		L	L	✱	L	L	L
STOP		H	H	✱	O	O	O

IC603

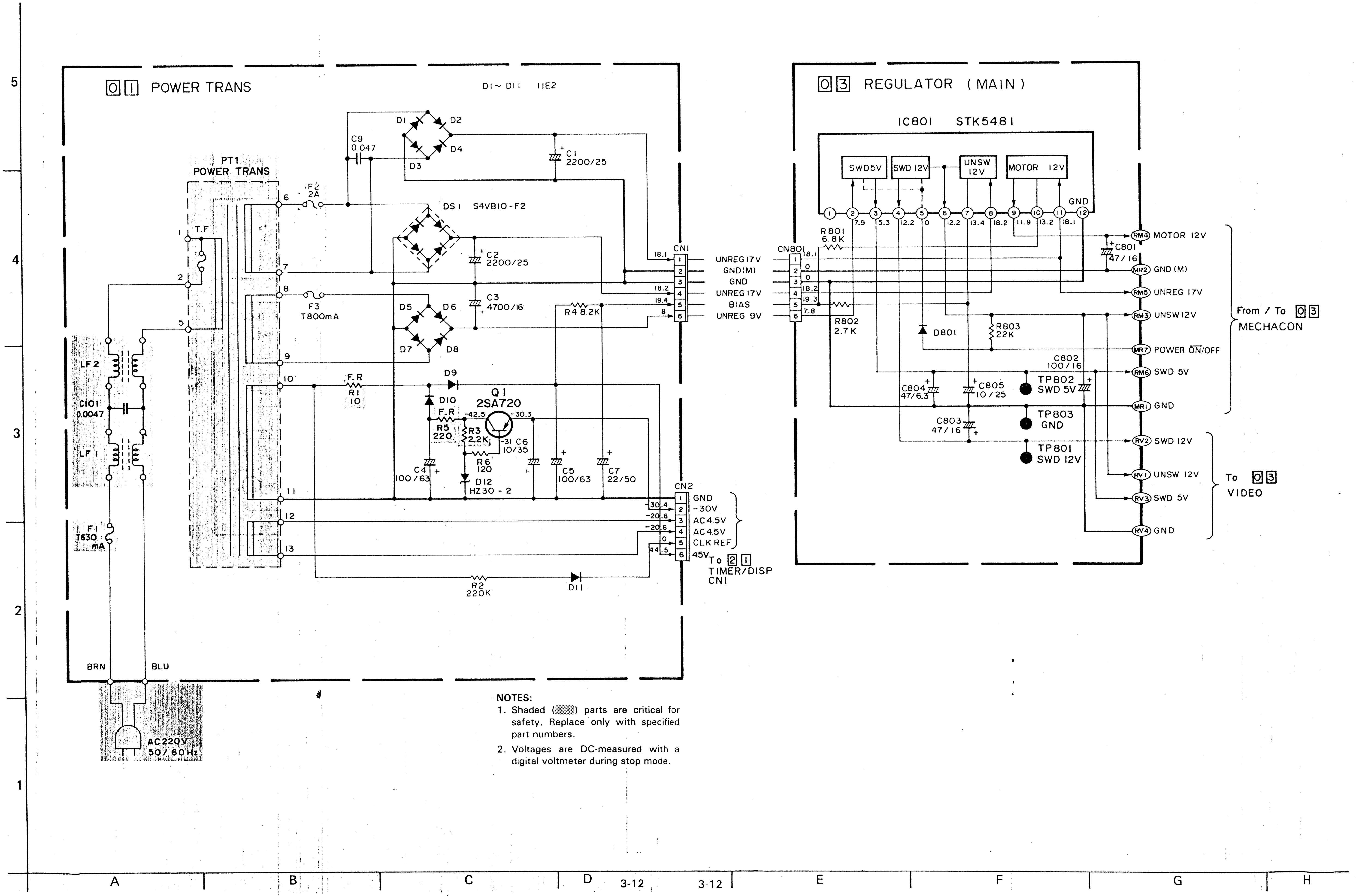
MOTOR	MODE	PINS			
		INPUT		OUTPUT	
		5	8	4	9
REEL	FWD	L	H	L	H
	REV	H	L	H	L
BRAKE		H	H	L	L
STOP		L	L	O	O

IC604

MOTOR	MODE	PINS			
		INPUT		OUTPUT	
		5	6	2	10
CAPSTAN	FWD	H	L	H	L
	REV	L	H	L	H
BRAKE		H	H	L	L
STOP		L	L	O	O

O : OPEN ✱ : H / L

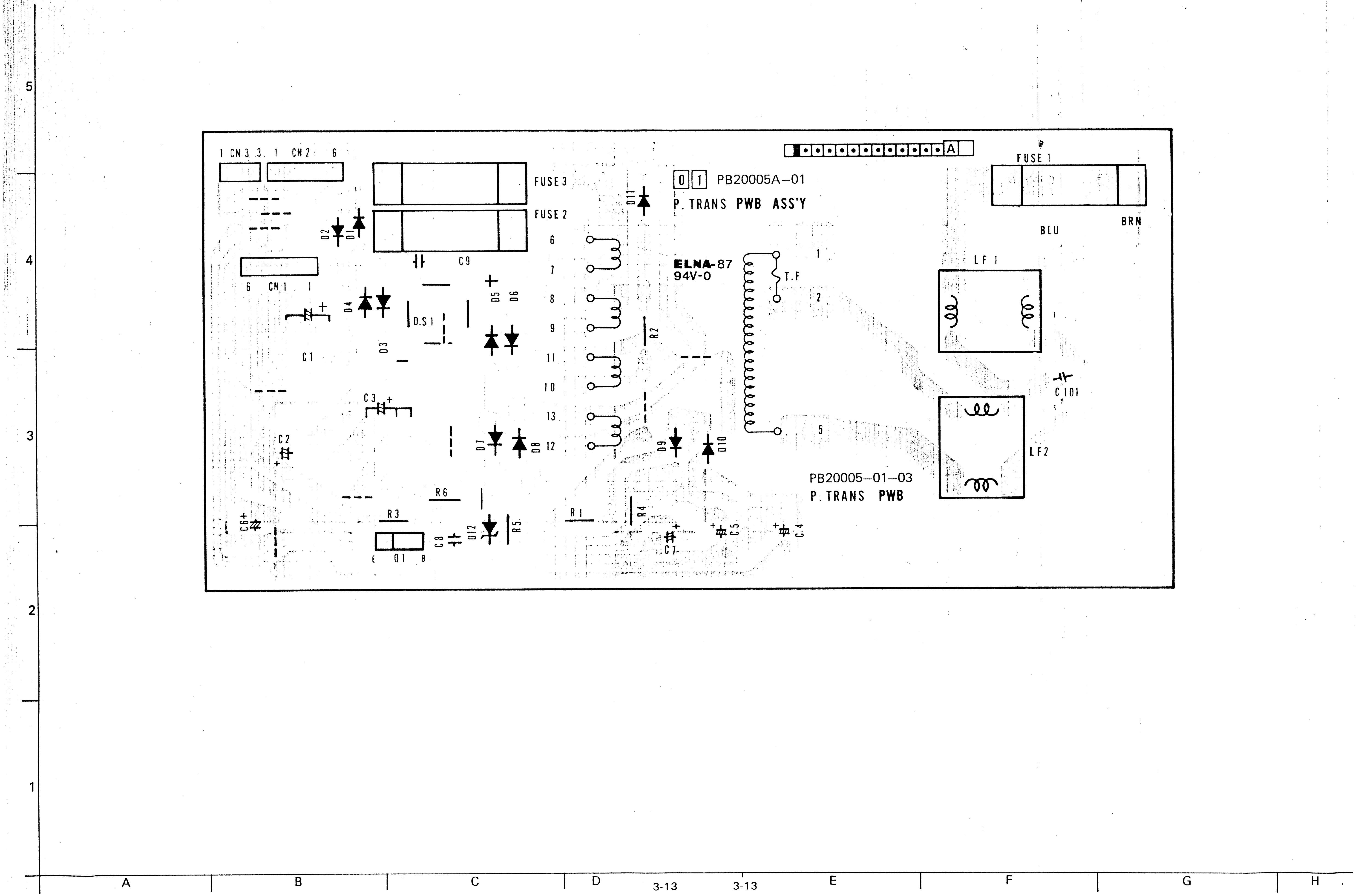
3.11 POWER TRANSFORMER AND REGULATOR SCHEMATIC DIAGRAMS


01 POWER TRANS
D1~D11 11E2
PT1 POWER TRANS
T.F
LF2
C101 0.0047
LF1
F1 T630 mA
BRN
BLU
AC220V 50/60Hz
C9 0.047
D1
D2
D3
D4
C1 2200/25
F2 2A
DS1 S4VB10-F2
C2 2200/25
F3 T800mA
C3 4700/16
D5
D6
D7
D8
R4 8.2K
F.R R1 10
D9
D10
F.R R5 220
Q1 2SA720
-42.5
-30.3
-31
R3 2.2K
C6 10/35
R6 120
D12 HZ30-2
C4 100/63
C5 100/63
C7 22/50
R2 220K
D11
CN1
18.1
18.2
19.4
8
UNREG 17V
GND(M)
GND
UNREG 17V
BIAS
UNREG 9V
CN2
-30.4
-20.6
-20.6
0
44.5
GND
-30V
AC4.5V
AC4.5V
CLK REF
45V
To 21 TIMER/DISP CN1
03 REGULATOR (MAIN)
IC801 STK5481
SWD5V
SWD 12V
UNSW 12V
MOTOR 12V
GND
7.9
5.3
12.2
0
12.2
13.4
18.2
11.9
13.2
18.1
R801 6.8K
CN801
18.1
0
0
18.2
19.3
7.8
R802 2.7K
D801
R803 22K
C801 47/16
C802 100/16
C804 47/6.3
C805 10/25
TP802 SWD 5V
TP803 GND
C803 47/16
TP801 SWD 12V
RM4 MOTOR 12V
MR2 GND (M)
RM5 UNREG 17V
RM3 UNSW12V
MR7 POWER ON/OFF
RM6 SWD 5V
MR1 GND
From / To 03 MECHACON
RV2 SWD 12V
RV1 UNSW 12V
RV3 SWD 5V
RV4 GND
To 03 VIDEO
A
B
C
D
E
F
G
H
1
2
3
4
5

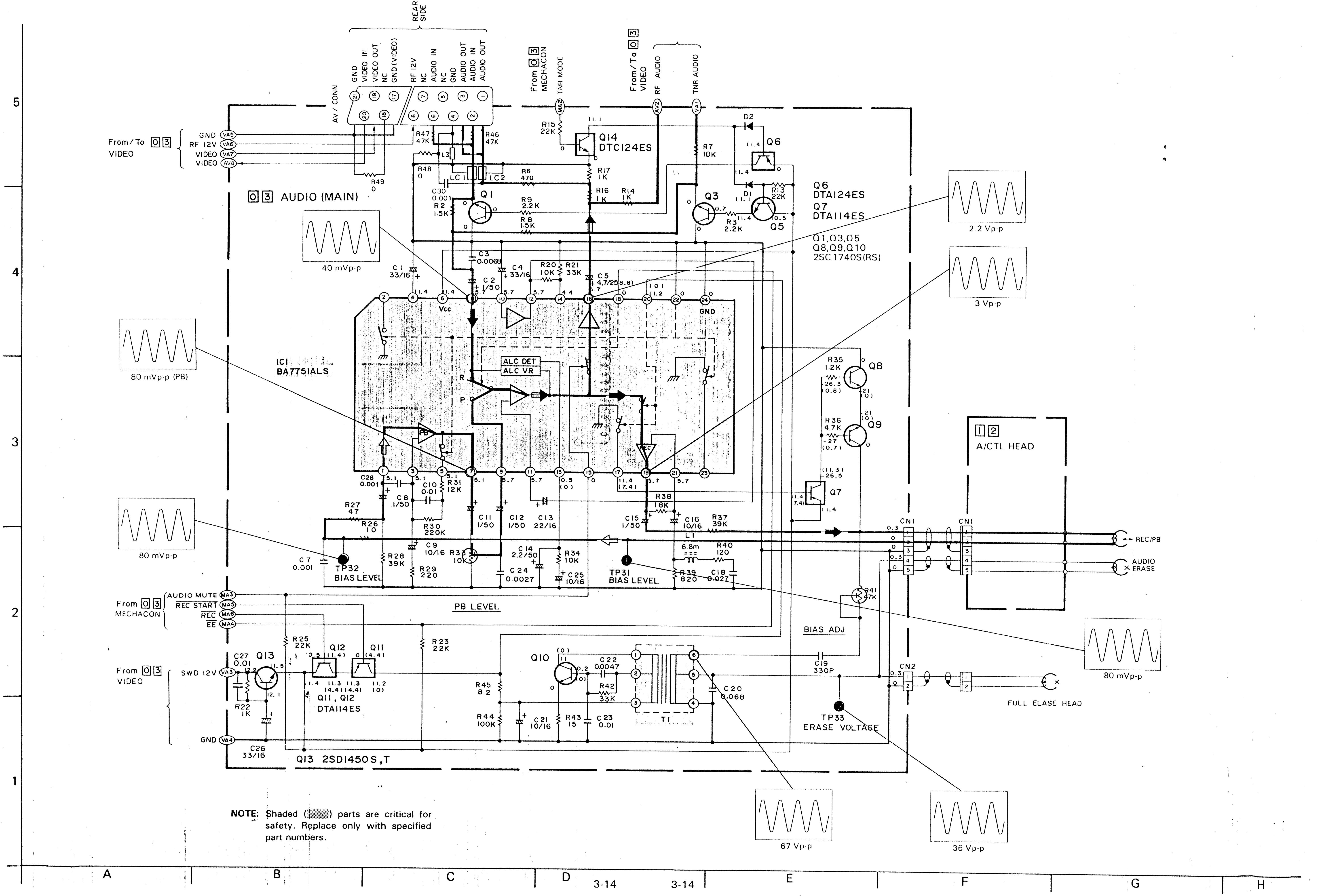
NOTES:

1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.12 POWER TRANSFORMER CIRCUIT BOARD


1 CN3 3
1 CN2 6
FUSE3
FUSE2
FUSE 1
D11
01 PB20005A-01
P. TRANS PWB ASS'Y
A
BLU
BRN
D2
D1
C9
6
7
8
9
11
10
13
12
6 CN1 1
ELNA-87
94V-0
T.F
1
2
5
D4
D5
D6
D.S1
D3
R2
LF1
C1
C101
C3
LF2
C2
D7
D8
D9
D10
PB20005-01-03
P. TRANS PWB
R6
R3
R1
R4
C6
C8
D12
R5
C7
C5
C4
E Q1 B
A
B
C
D
E
F
G
H
1
2
3
4
5

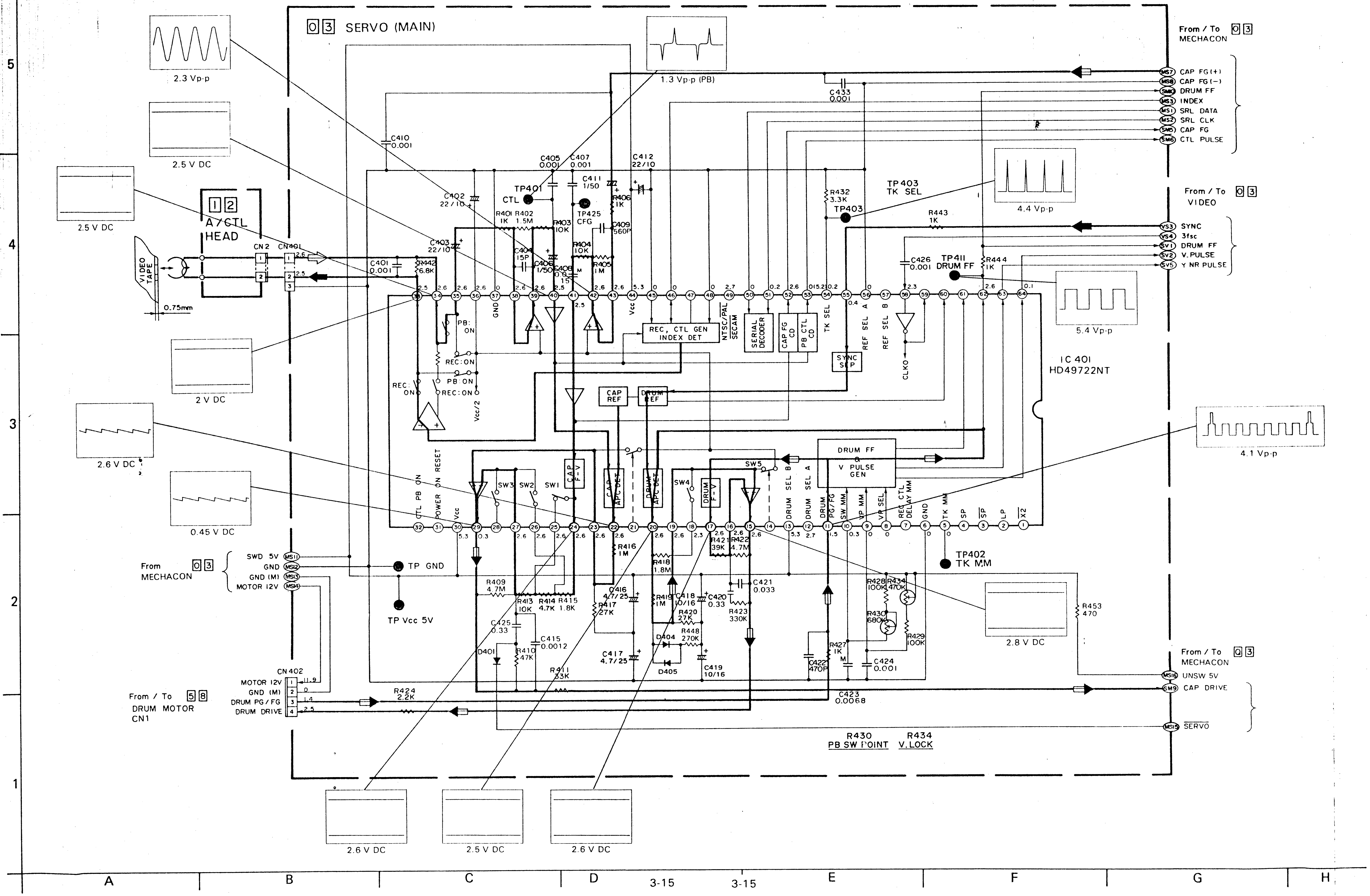
3.13 AUDIO SCHEMATIC DIAGRAM



REAR SIDE
AV/CONN
GND
VIDEO IN
VIDEO OUT
NC
GND (VIDEO)
RF 12V
NC
AUDIO IN
NC
GND
AUDIO OUT
AUDIO IN
AUDIO OUT
From 03 MECHACON
TNR MODE
From/To 03 VIDEO
RF AUDIO
TNR AUDIO
From/To 03 VIDEO
GND VA5
RF 12V VA6
VIDEO VA7
VIDEO AV4
03 AUDIO (MAIN)
Q14 DTC124ES
Q6 DTA124ES
Q7 DTA114ES
Q1,Q3,Q5 Q8,Q9,Q10 2SC1740S(RS)
IC1 BA7751ALS
ALC DET
ALC VR
Vcc
GND
REC
PB
40 mVp-p
80 mVp-p (PB)
80 mVp-p
2.2 Vp-p
3 Vp-p
80 mVp-p
67 Vp-p
36 Vp-p
TP32 BIAS LEVEL
TP31 BIAS LEVEL
PB LEVEL
BIAS ADJ
TP33 ERASE VOLTAGE
12 A/CTL HEAD
CN1
CN2
REC/PB
AUDIO ERASE
FULL ELASE HEAD
From 03 MECHACON
AUDIO MUTE MA3
REC START MA5
REC MA6
EE MA4
From 03 VIDEO
SWD 12V VA3
GND VA4
Q13 2SD1450S,T
Q11, Q12 DTA114ES
Q10
T1
5
4
3
2
1
A
B
C
D
E
F
G
H

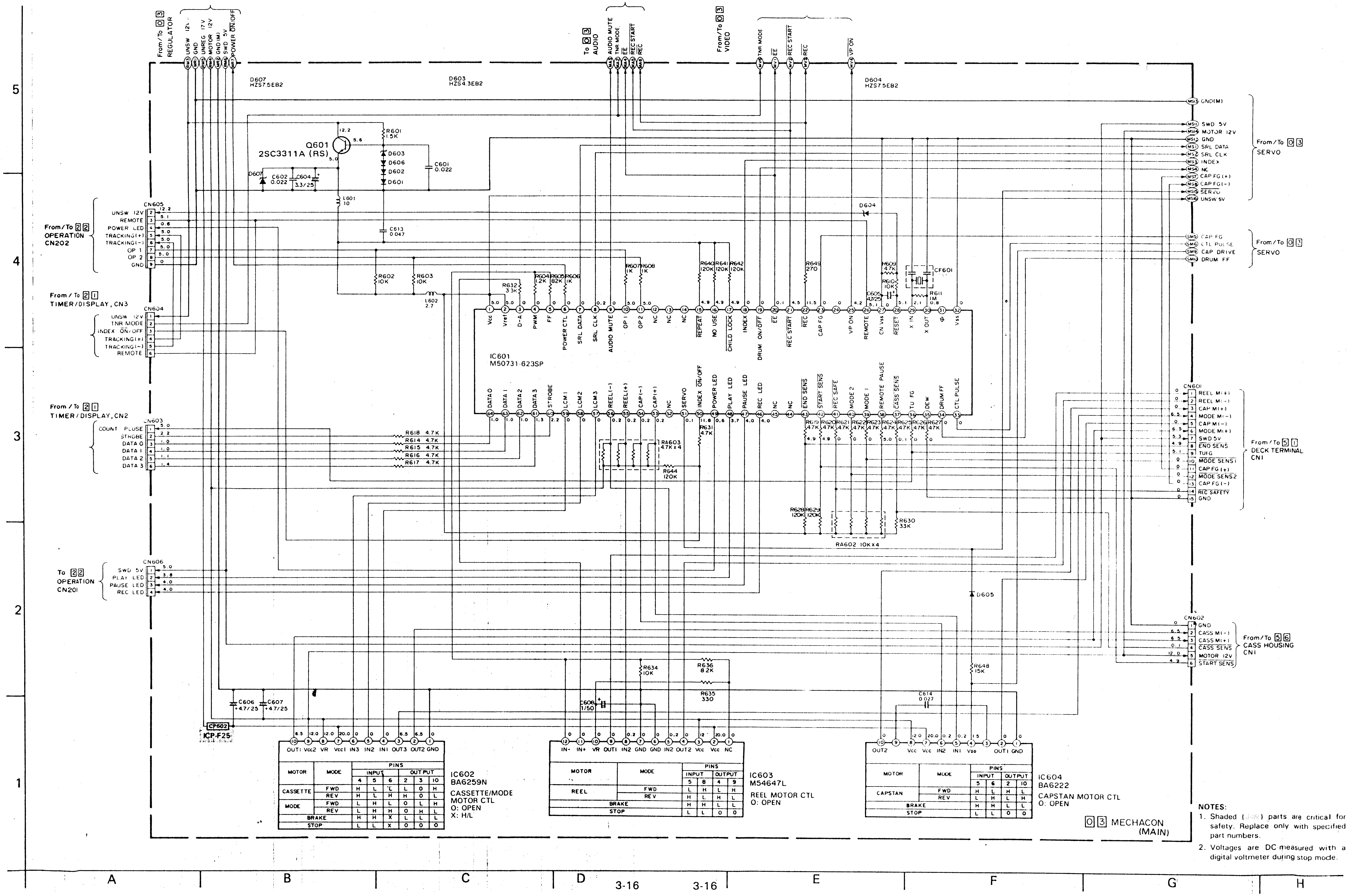
NOTE: Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

3.14 SERVO SCHEMATIC DIAGRAM



03 SERVO (MAIN)
12 A/CTL HEAD
VIDEO TAPE
0.75mm
CN2
CN401
2.3 Vp-p
2.5 V DC
2.5 V DC
2 V DC
2.6 V DC
0.45 V DC
1.3 Vp-p (PB)
4.4 Vp-p
5.4 Vp-p
4.1 Vp-p
2.8 V DC
2.6 V DC
2.5 V DC
2.6 V DC
TP401 CTL
TP425 CFG
TP403 TK SEL
TP403
TP411 DRUM FF
TP402 TK MM
TP GND
TP Vcc 5V
IC 401
HD49722NT
REC, CTL GEN INDEX DET
NTSC/PAL SECAM
SERIAL DECODER
CAP FG CD
PB CTL CD
SYNC SEP
CAP REF
DRUM REF
CAP F-V
CAP APC DET
DRUM APC DET
DRUM F-V
DRUM FF & V PULSE GEN
SW1
SW2
SW3
SW4
SW5
PB: ON
REC: ON
PB ON
REC: ON
Vcc/2
GND
Vcc
TK SEL
REF SEL A
REF SEL B
CLKO
CTL PB ON
POWER ON RESET
DRUM SEL B
DRUM SEL A
DRUM PG/FG
SW MM
VP MM
VR SEL
REC CTL DELAY MM
TK MM
SP
SP
LP
X2
C410 0.001
C405 0.001
C407 0.001
C411 1/50
C412 22/10
C402 22/10
C403 22/10
C401 0.001
C404 15P
C406 1/50
C408 0.015
C409 560P
C433 0.001
C426 0.001
C416 4.7/25
C417 4.7/25
C418 10/16
C419 10/16
C420 0.33
C421 0.033
C422 470P
C423 0.0068
C424 0.001
C425 0.33
C415 0.0012
R401 1K
R402 1.5M
R403 10K
R404 10K
R405 1M
R406 1K
R442 6.8K
R432 3.3K
R443 1K
R444 1K
R409 4.7M
R410 47K
R411 33K
R413 10K
R414 4.7K
R415 1.8K
R416 1M
R417 27K
R418 1.8M
R419 1M
R420 27K
R421 39K
R422 4.7M
R423 330K
R424 2.2K
R427 1K
R428 100K
R429 100K
R430 680K
R434 470K
R448 270K
R453 470
D401
D404
D405
From / To 03 MECHACON
MS7 CAP FG(+)
MS8 CAP FG(−)
SM10 DRUM FF
MS3 INDEX
MS1 SRL DATA
MS2 SRL CLK
SM5 CAP FG
SM6 CTL PULSE
From / To 03 VIDEO
VS3 SYNC
VS4 3fsc
SV1 DRUM FF
SV2 V.PULSE
SV5 Y NR PULSE
From 03 MECHACON
MS11 SWD 5V
MS12 GND
MS13 GND (M)
MS14 MOTOR 12V
From / To 58 DRUM MOTOR CN1
CN402
MOTOR 12V
GND (M)
DRUM PG/FG
DRUM DRIVE
From / To 03 MECHACON
MS16 UNSW 5V
SM9 CAP DRIVE
MS15 SERVO
R430 PB SW POINT
R434 V.LOCK
A
B
C
D
E
F
G
H
1
2
3
4
5

3.15 MECHANISM CONTROL SCHEMATIC DIAGRAM


From/To 0 3 REGULATOR
UNSW 12V
GND
UNREG 17V
MOTOR 12V
GND (M)
SWD 5V
POWER ON/OFF
To 0 3 AUDIO
AUDIO MUTE
TNR MODE
EE
REC START
REC
From/To 0 3 VIDEO
TNR MODE
EE
REC START
REC
VP ON
D607 HZS7.5EB2
D603 HZS4.3EB2
D604 HZS7.5EB2
Q601 2SC3311A (RS)
R601 1.5K
D603
D606
D602
D601
C601 0.022
D607
C602 0.022
C604 3.3/25
L601 10
C613 0.047
R602 10K
R603 10K
L602 2.7
R632 3.3K
R604 12K
R605 82K
R606 1K
R607 1K
R608 1K
R640 120K
R641 120K
R642 120K
R649 270
R609 4.7K
R610 10K
C605 47/25
R611 1M
CF601
IC601 M50731-623SP
Vcc
Vref
D-A
PWM
FF
POWER CTL
SRL DATA
SRL CLK
AUDIO MUTE
OP 1
OP 2
NC
REPEAT
NO USE
CHILD LOCK
INDEX
DRUM ON/OFF
EE
REC START
REC
CAP FG
VP ON
REMOTE
CN Vss
RESET
X IN
X OUT
Φ
Vss
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
LCM 1
LCM 2
LCM 3
REEL(−)
REEL(+)
CAP(−)
CAP(+)
SERVO
INDEX ON/OFF
POWER LED
PLAY LED
PAUSE LED
REC LED
END SENS
START SENS
REC SAFE
MODE 2
MODE 1
REMOTE PAUSE
CASS SENS
TU FG
DEW
DRUM FF
CTL PULSE
From/To 2 2 OPERATION CN202
CN605
UNSW 12V
REMOTE
POWER LED
TRACKING(+)
TRACKING(−)
OP 1
OP 2
GND
From/To 2 1 TIMER/DISPLAY, CN3
CN604
UNSW 12V
TNR MODE
INDEX ON/OFF
TRACKING(+)
TRACKING(−)
REMOTE
From/To 2 1 TIMER/DISPLAY, CN2
CN603
COUNT PULSE
STROBE
DATA 0
DATA 1
DATA 2
DATA 3
R618 4.7K
R614 4.7K
R615 4.7K
R616 4.7K
R617 4.7K
RA603 4.7K×4
R644 120K
R631 4.7K
R619 47K
R620 47K
R621 47K
R622 47K
R623 47K
R624 47K
R625 47K
R626 47K
R627 47K
R628 120K
R629 120K
R630 33K
RA602 10K×4
To 2 2 OPERATION CN201
CN606
SWD 5V
PLAY LED
PAUSE LED
REC LED
GND(M)
SWD 5V
MOTOR 12V
GND
SRL DATA
SRL CLK
INDEX
NC
CAP FG(+)
CAP FG(−)
SERVO
UNSW 5V
From/To 0 3 SERVO
CAP FG
CTL PULSE
CAP DRIVE
DRUM FF
From/To 0 3 SERVO
CN601
REEL M(+)
REEL M(−)
CAP M(+)
MODE M(−)
CAP M(−)
MODE M(+)
SWD 5V
END SENS
TU FG
MODE SENS1
CAP FG(+)
MODE SENS2
CAP FG(−)
REC SAFETY
GND
From/To 5 1 DECK TERMINAL CN1
D605
CN602
GND
CASS M(−)
CASS M(+)
CASS SENS
MOTOR 12V
START SENS
From/To 5 6 CASS HOUSING CN1
R648 15K
R634 10K
R636 8.2K
R635 330
C608 1/50
C614 0.027
C606 +4.7/25
C607 +4.7/25
CP602 ICP-F25
OUT1
Vcc2
VR
Vcc1
IN3
IN2
IN1
OUT3
OUT2
GND
IN−
IN+
VR
OUT1
IN2
GND
GND
IN2
OUT2
Vcc
Vcc
NC
OUT2
Vcc
Vcc
IN2
IN1
VDD
OUT1
GND
0 3 MECHACON (MAIN)
5
4
3
2
1
A
B
C
D
E
F
G
H

IC602
BA6259N
CASSETTE/MODE
MOTOR CTL
O: OPEN
X: H/L

MOTOR	MODE	PINS					
		INPUT			OUTPUT		
		4	5	6	2	3	10
CASSETTE	FWD	H	L	L	L	O	H
	REV	H	L	H	H	O	L
MODE	FWD	L	H	L	O	L	H
	REV	L	H	H	O	H	L
BRAKE		H	H	X	L	L	L
STOP		L	L	X	O	O	O

IC603
M54647L
REEL MOTOR CTL
O: OPEN

MOTOR	MODE	PINS			
		INPUT		OUTPUT	
		5	8	4	9
REEL	FWD	L	H	L	H
	REV	H	L	H	L
BRAKE		H	H	L	L
STOP		L	L	O	O

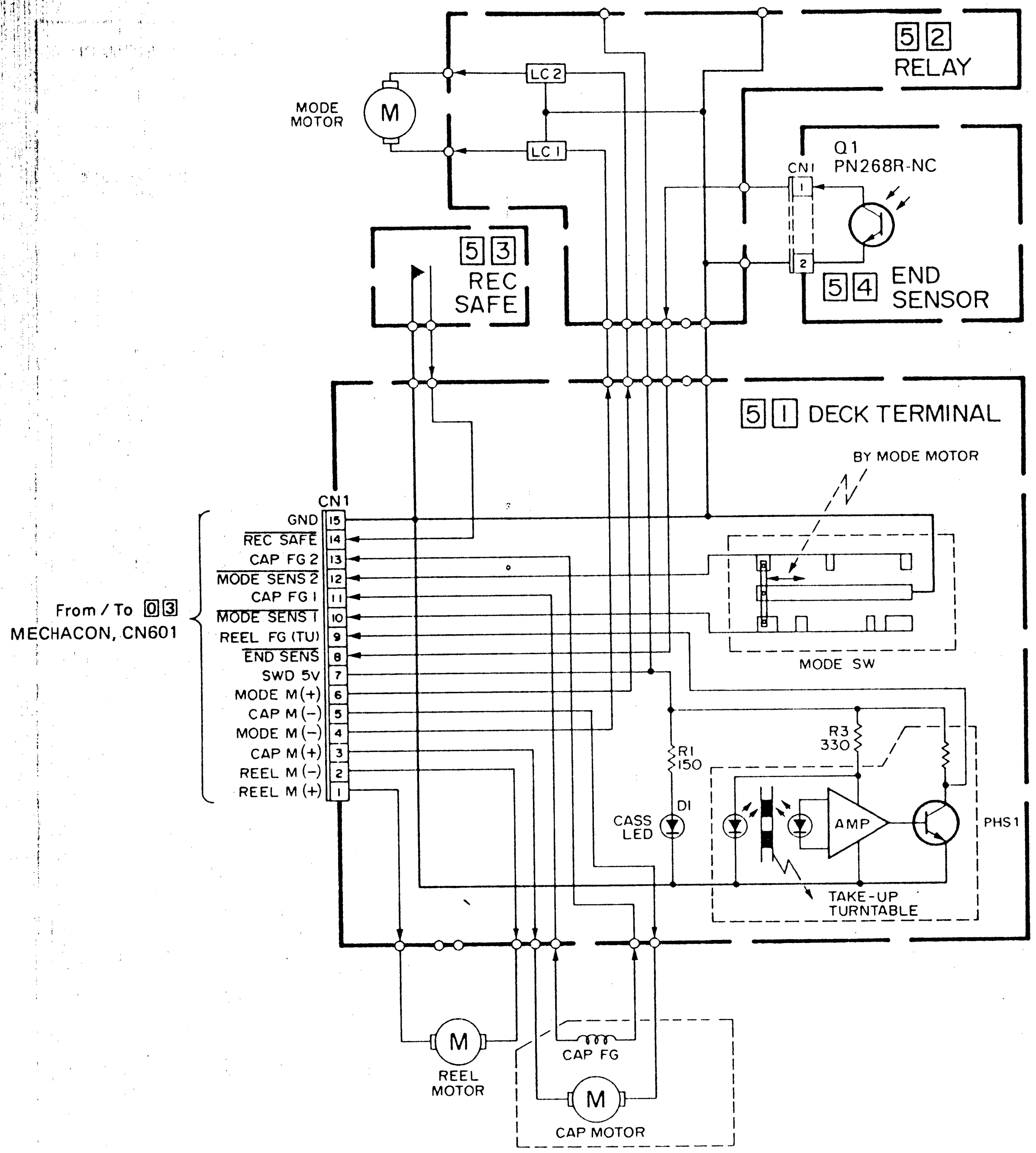
IC604
BA6222
CAPSTAN MOTOR CTL
O: OPEN

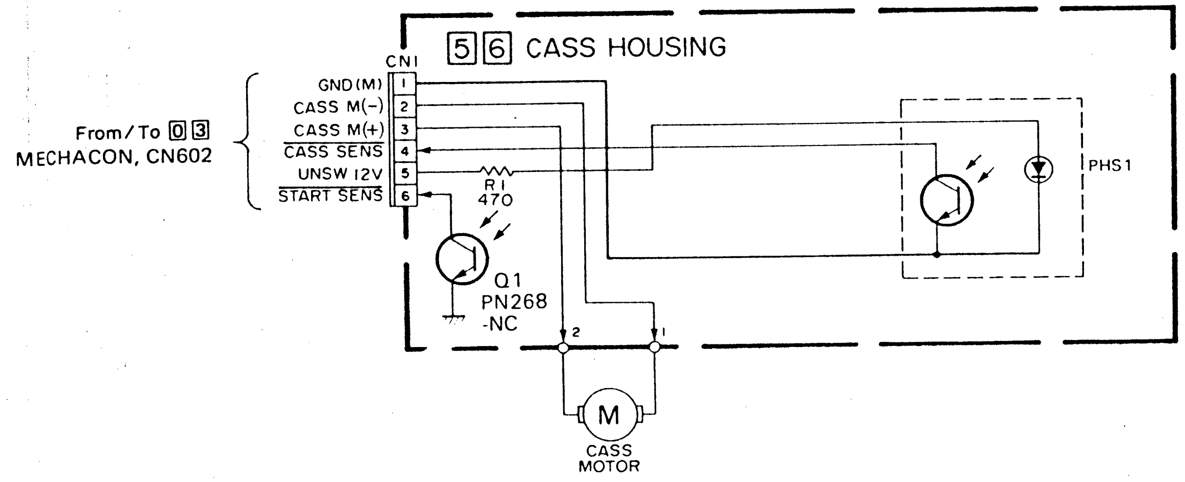
MOTOR	MODE	PINS			
		INPUT		OUTPUT	
		5	6	2	10
CAPSTAN	FWD	H	L	H	L
	REV	L	H	L	H
BRAKE		H	H	L	L
STOP		L	L	O	O

NOTES:

1. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC measured with a digital voltmeter during stop mode.

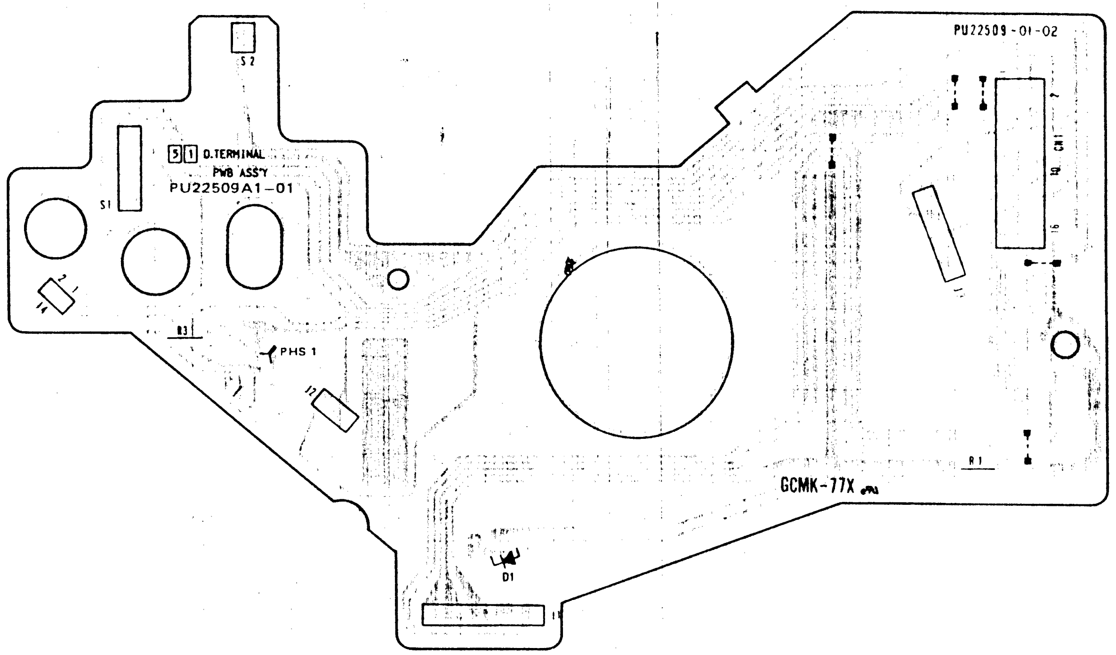
3.16 DECK TERMINAL SCHEMATIC DIAGRAMS


52 RELAY
MODE MOTOR
M
LC2
LC1
Q1
PN268R-NC
CN1
1
2
54 END SENSOR
53 REC SAFE
51 DECK TERMINAL
BY MODE MOTOR
CN1
GND 15
REC SAFE 14
CAP FG2 13
MODE SENS2 12
CAP FG1 11
MODE SENS1 10
REEL FG (TU) 9
END SENS 8
SWD 5V 7
MODE M(+) 6
CAP M(−) 5
MODE M(−) 4
CAP M(+) 3
REEL M(−) 2
REEL M(+) 1
From/To 03
MECHACON, CN601
MODE SW
R3
330
R1
150
D1
CASS LED
AMP
PHS1
TAKE-UP TURNTABLE
M
REEL MOTOR
CAP FG
M
CAP MOTOR

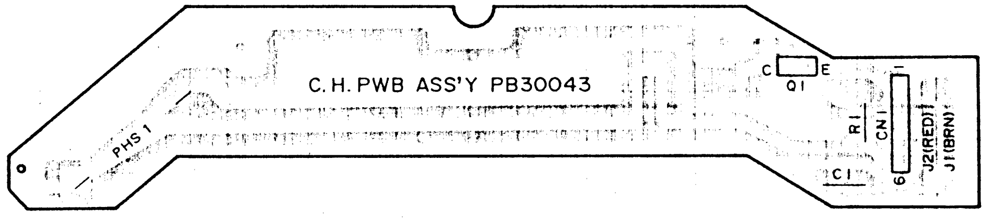

56 CASS HOUSING
CN1
GND(M) 1
CASS M(−) 2
CASS M(+) 3
CASS SENS 4
UNSW 12V 5
START SENS 6
From/To 03
MECHACON, CN602
R1
470
Q1
PN268
-NC
PHS1
2
1
M
CASS MOTOR

3.17 DECK TERMINAL CIRCUIT BOARDS

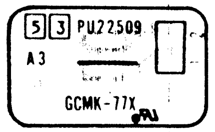
—DECK TERMINAL—


PU22509-01-02
S2
S1
51 D.TERMINAL PWB ASS'Y
PU22509A1-01
R3
PHS1
CN1
GCMK-77X
R1
D1

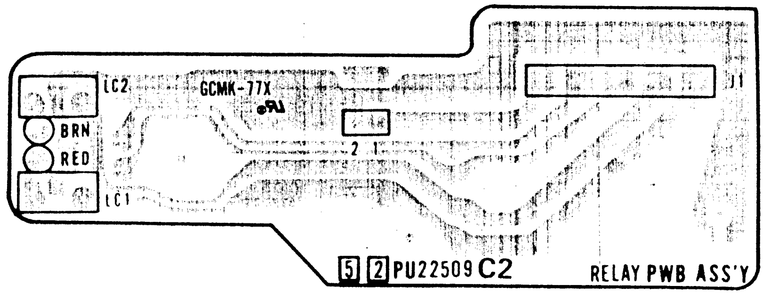
—CASSETTE HOUSING—


C.H. PWB ASS'Y PB30043
PHS1
C
E
Q1
R1
CN1
C1
6
J2(RED)
J1(BRN)

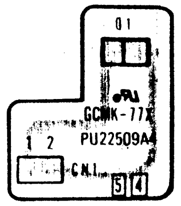
—REC SAFETY—


53 PU22509
A3
GCMK-77X

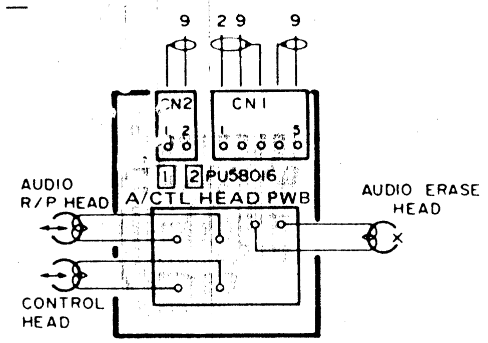
—RELAY—


LC2
GCMK-77X
BRN
RED
LC1
J1
52 PU22509 C2
RELAY PWB ASS'Y

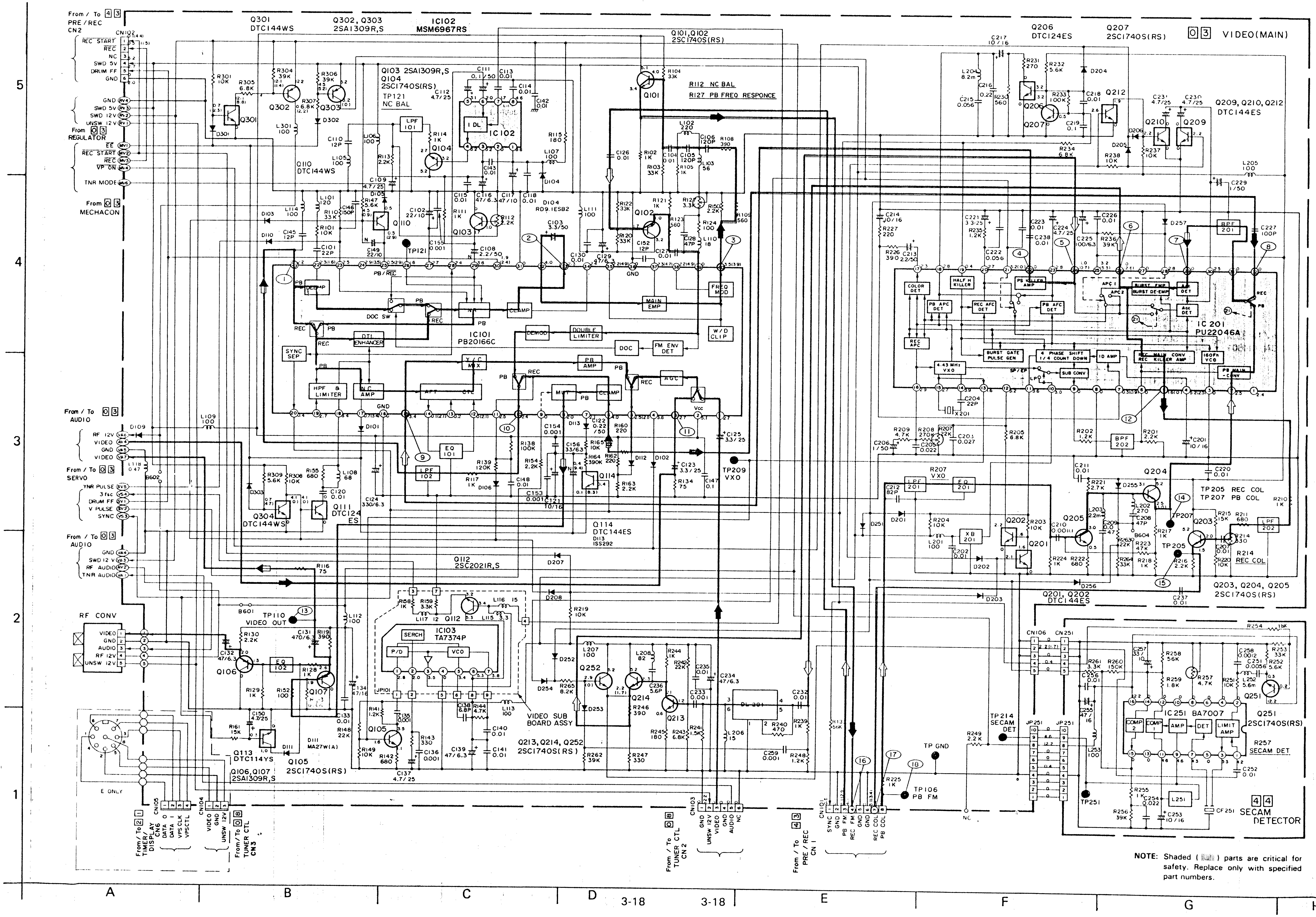
—END SENSOR—


Q1
GCMK-77X
PU22509A4
1 2
CN1
54

—AUDIO/CTL HEAD—


9
2 9
9
CN2
CN1
1 2
1 5
12 PU58016
A/CTL HEAD PWB
AUDIO R/P HEAD
AUDIO ERASE HEAD
CONTROL HEAD

3.18 VIDEO SCHEMATIC DIAGRAM

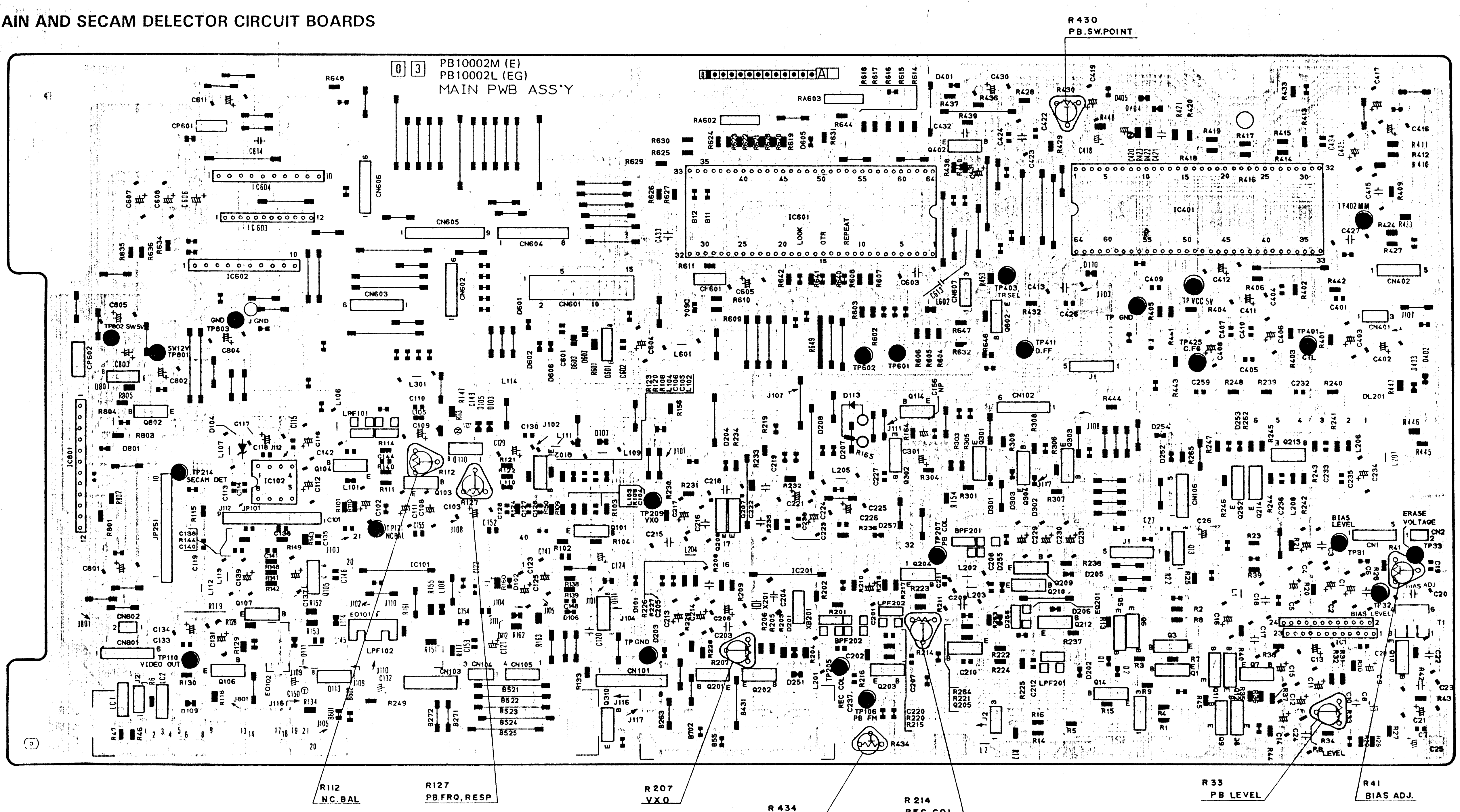


03 VIDEO(MAIN)
From / To 43 PRE / REC CN2
CN102
REC START
REC
NC
SWD 5V
DRUM FF
GND
GND
SWD 5V
SWD 12V
UNSW 12V
From 03 REGULATOR
EE
REC START
REC
VP ON
TNR MODE
From 03 MECHACON
Q301 DTC144WS
Q302, Q303 2SA1309R,S
IC102 MSM6967RS
Q101, Q102 2SC1740S(RS)
R112 NC BAL
R127 PB FREQ RESPONCE
Q103 2SA1309R,S
Q104 2SC1740S(RS)
TP121 NC BAL
Q110 DTC144WS
LPF 101
1 DL
IC102
D104 RD9.1ESB2
TP121
IC101 PB20166C
PB DEEMP
DOC SW
CLAMP
DTL ENHANCER
SYNC SEP
HPF & LIMITER
N.C AMP
Y/C MIX
APT CTL
DEMOD
DOUBLE LIMITER
DOC
FM ENV DET
PB AMP
MIX
CLAMP
AGC
MAIN EMP
FREQ MOD
W/D CLIP
EQ 101
LPF 102
From / To 03 AUDIO
RF 12V
VIDEO
GND
VIDEO
From / To 03 SERVO
YNR PULSE
3 fsc
DRUM FF
V PULSE
SYNC
From / To 03 AUDIO
GND
SWD 12V
RF AUDIO
TNR AUDIO
Q304 DTC144WS
Q111 DTC124ES
Q114 DTC144ES
D113 1SS292
Q112 2SC2021R,S
TP209 VXO
RF CONV
VIDEO
GND
AUDIO
RF 12V
UNSW 12V
TP110 VIDEO OUT
Q106
Q107
EQ 102
Q113 DTC114YS
Q106, Q107 2SA1309R,S
Q105 2SC1740S(RS)
D111 MA27W(A)
IC103 TA7374P
SERCH
P/D
VCO
JP101
VIDEO SUB BOARD ASSY
Q213, Q214, Q252 2SC1740S(RS)
DL 201
E ONLY
CN105
From / To 21 TIMER / DISPLAY CN6
GND
DATA 1
VPS CLK
VPS CTL
CN104
VIDEO
GND
UNSW 12V
From / To 08 TUNER CTL CN3
CN103
From / To 08 TUNER CTL CN2
GND
UNSW 12V
VIDEO
GND
AUDIO
NC
From / To 43 PRE / REC CN1
CN101
SYNC
GND
PB FM
REC FM
GND
GND
REC COL
PB COL
Q206 DTC124ES
Q207 2SC1740S(RS)
Q209, Q210, Q212 DTC144ES
IC201 PU22046A
COLOR DET
HALF H KILLER
PB APC DET
REC AFC DET
PS KILLER AMP
PB AFC DET
APC 1
APC 2
BURST EMP
BURST DE-EMP
ACC DET
REC APC
BURST GATE PULSE GEN
4 PHASE SHIFT 1/4 COUNT DOWN
ID AMP
REC MAIN CONV
REC KILLER AMP
160fh VCO
PB MAIN CONV
4.43 MHz VXO
SUB CONV
SP/EP
LP
X201
BPF 201
BPF 202
LPF 201
EQ 201
LPF 202
XB 201
Q204
TP205 REC COL
TP207 PB COL
Q205
Q203
Q202
Q201
TP205
R214 REC COL
Q201, Q202 DTC144ES
Q203, Q204, Q205 2SC1740S(RS)
TP214 SECAM DET
TP GND
TP106 PB FM
CN106
CN251
JP251
IC251 BA7007
COMP 2
COMP
AMP
DET
LIMIT AMP
Q251 2SC1740S(RS)
R257 SECAM DET
L251
CF251
TP251
44 SECAM DETECTOR
NC
A
B
C
D
E
F
G
H
1
2
3
4
5

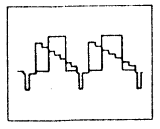
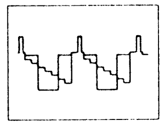
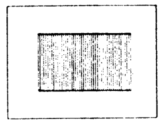
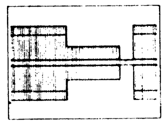
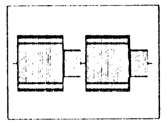
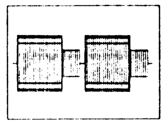
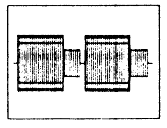
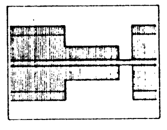
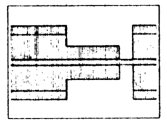
NOTE: Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

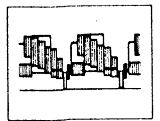
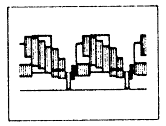
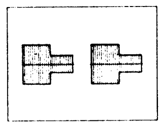
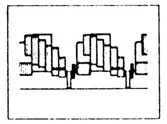
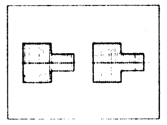
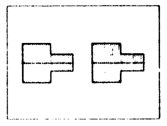
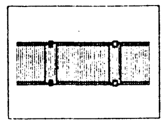
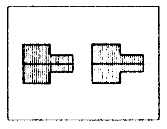
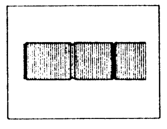
3.19 MAIN AND SECAM DELECTOR CIRCUIT BOARDS

—MAIN—

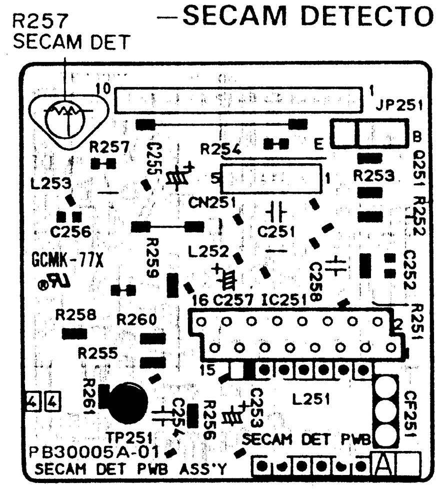

PB10002M (E)
PB10002L (EG)
MAIN PWB ASS'Y
R430
PB.SW.POINT
IC601
IC401
IC101
IC201
R112
NC.BAL
R127
PB.FRQ.RESP
R207
VXO
R434
V.LOCK
R214
REC COL.
R33
PB LEVEL
R41
BIAS ADJ.
BIAS LEVEL
ERASE VOLTAGE

—Waveforms of VIDEO circuit—

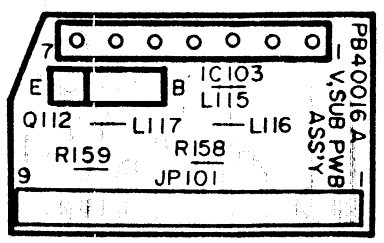
1	2	3	4	5	6	7	8	9
								
IC101-21 REC 0.3 Vp-p	IC101-33 REC 1.3 Vp-p	IC101-40 REC 0.95 Vp-p	IC201-22 PB 0.55 Vp-p	IC201-24 REC 0.3 Vp-p	IC201-26 REC 1.0 Vp-p	IC201-29 REC 0.3 Vp-p	IC201-32 PB 0.68 Vp-p	IC101-15 PB 0.55 Vp-p

10	11	12	13	14	15	16	17	18
								
IC101-10 REC 0.6 Vp-p	IC101-3 REC 0.8 Vp-p	IC201-5 REC 1.2 Vp-p	TP110 REC 2.0 Vp-p	TP207 PB 0.25 Vp-p	TP205 REC 50 mVp-p	CN101-4 REC 0.68 Vp-p	CN101-7 REC 50 mVp-p	TP106 PB 0.3 Vp-p

—SECAM DETECTOR—


R257
SECAM DET
IC251
TP251
GCMK-77X
PB30005A-01
SECAM DET PWB ASS'Y
SECAM DET PWB

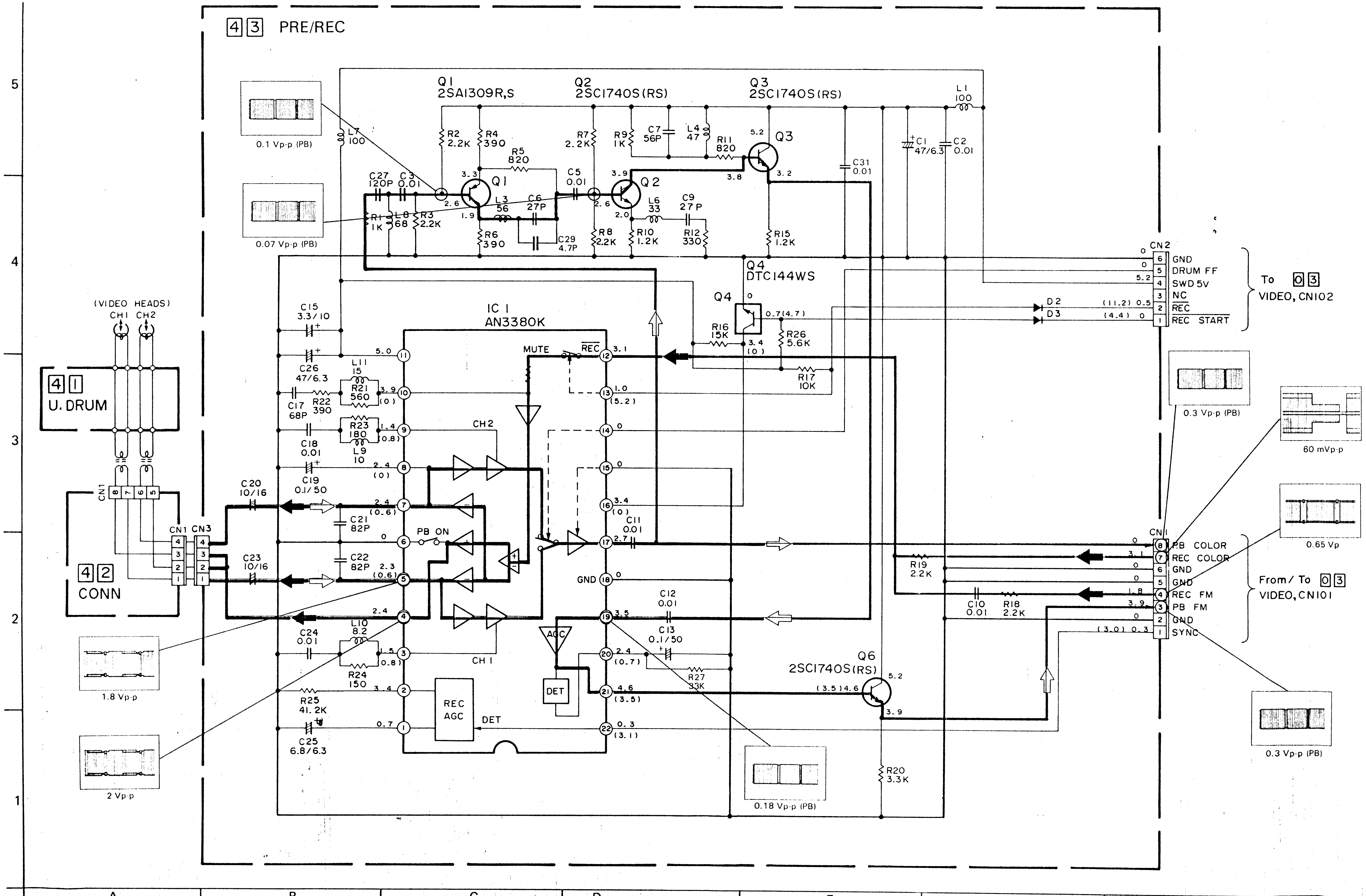
—VIDEO SUB—


PB40016A
—V,SUB PWB ASS'Y
IC103
L115
Q112
L117
L116
R159
R158
JP101

5 4 3 2 1

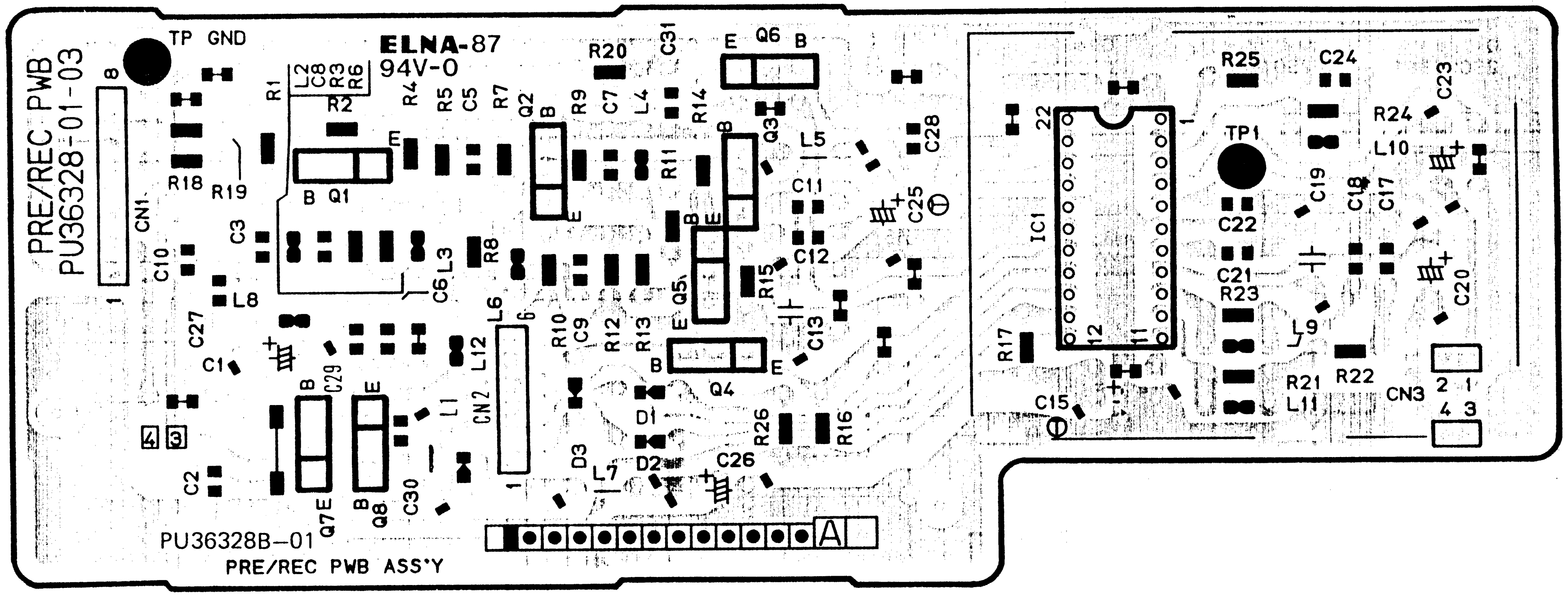
A B C D E F G H

3.20 PRE/REC SCHEMATIC DIAGRAM

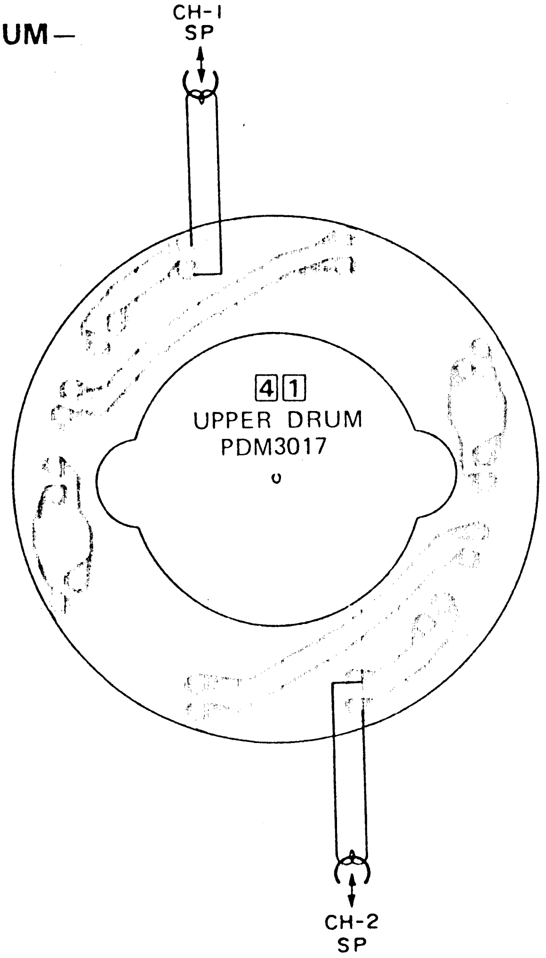

4 3 PRE/REC
Q1 2SA1309R,S
Q2 2SC1740S(RS)
Q3 2SC1740S(RS)
Q4 DTC144WS
Q6 2SC1740S(RS)
IC 1 AN3380K
L1 100
L7 100
C1 47/6.3
C2 0.01
R2 2.2K
R4 390
R5 820
R7 2.2K
R9 1K
C7 56P
L4 47
R11 820
C31 0.01
C27 120P
C3 0.01
C5 0.01
R1 1K
L8 68
R3 2.2K
L3 56
C6 27P
C29 4.7P
R6 390
R8 2.2K
L6 33
C9 27P
R10 1.2K
R12 330
R15 1.2K
R16 15K
R26 5.6K
R17 10K
C15 3.3/10
C26 47/6.3
L11 15
R21 560
C17 68P
R22 390
R23 180
L9 10
C18 0.01
C19 0.1/50
C20 10/16
C21 82P
C22 82P
C23 10/16
C24 0.01
L10 8.2
R24 150
R25 41.2K
C25 6.8/6.3
C11 0.01
C12 0.01
C13 0.1/50
R27 33K
R19 2.2K
C10 0.01
R18 2.2K
R20 3.3K
D2
D3
MUTE
REC
PB ON
CH2
CH1
GND
AGC
DET
REC AGC
(VIDEO HEADS)
CH1 CH2
4 1 U. DRUM
4 2 CONN
CN1
CN3
CN2
6 GND
5 DRUM FF
4 SWD 5V
3 NC
2 REC
1 REC START
To 0 3 VIDEO, CN102
CN1
8 PB COLOR
7 REC COLOR
6 GND
5 GND
4 REC FM
3 PB FM
2 GND
1 SYNC
From/To 0 3 VIDEO, CN101
0.1 Vp-p (PB)
0.07 Vp-p (PB)
0.3 Vp-p (PB)
60 mVp-p
0.65 Vp
0.3 Vp-p (PB)
0.18 Vp-p (PB)
1.8 Vp-p
2 Vp-p
5
4
3
2
1
A
B
C
D
E
F
G
H

3.21 PRE/REC AND UPPER DRUM CIRCUIT BOARDS

—PRE/REC—


TP GND
PRE/REC PWB
PU36328-01-03
ELNA-87
94V-0
R20
C31
E Q6 B
R25
C24
C23
R1
L2 C8 R3 R6
R2
R4 R5 C5 R7
Q2 B R9 C7 L4 R14 B Q3
L5
C28
22
1
TP1
R24
L10
E
R18
R19
B Q1
E
R11
C11
C25
IC1
C22
C19
C18
C17
CN1
C10
C3
L3 R8
C6
L8
B Q5 E
R15
C12
C21
R23
C20
C27
C1
L6
L12
R10 C9 R12 R13
C13
R17
12
11
L9
C29
B E
CN2
B Q4 E
R21 R22
L11
CN3 2 1 4 3
C15
L1
D1
R26 R16
4 3
C2
D3
L7
D2
C26
Q7 E
B Q8
C30
PU36328B–01
PRE/REC PWB ASS'Y
A

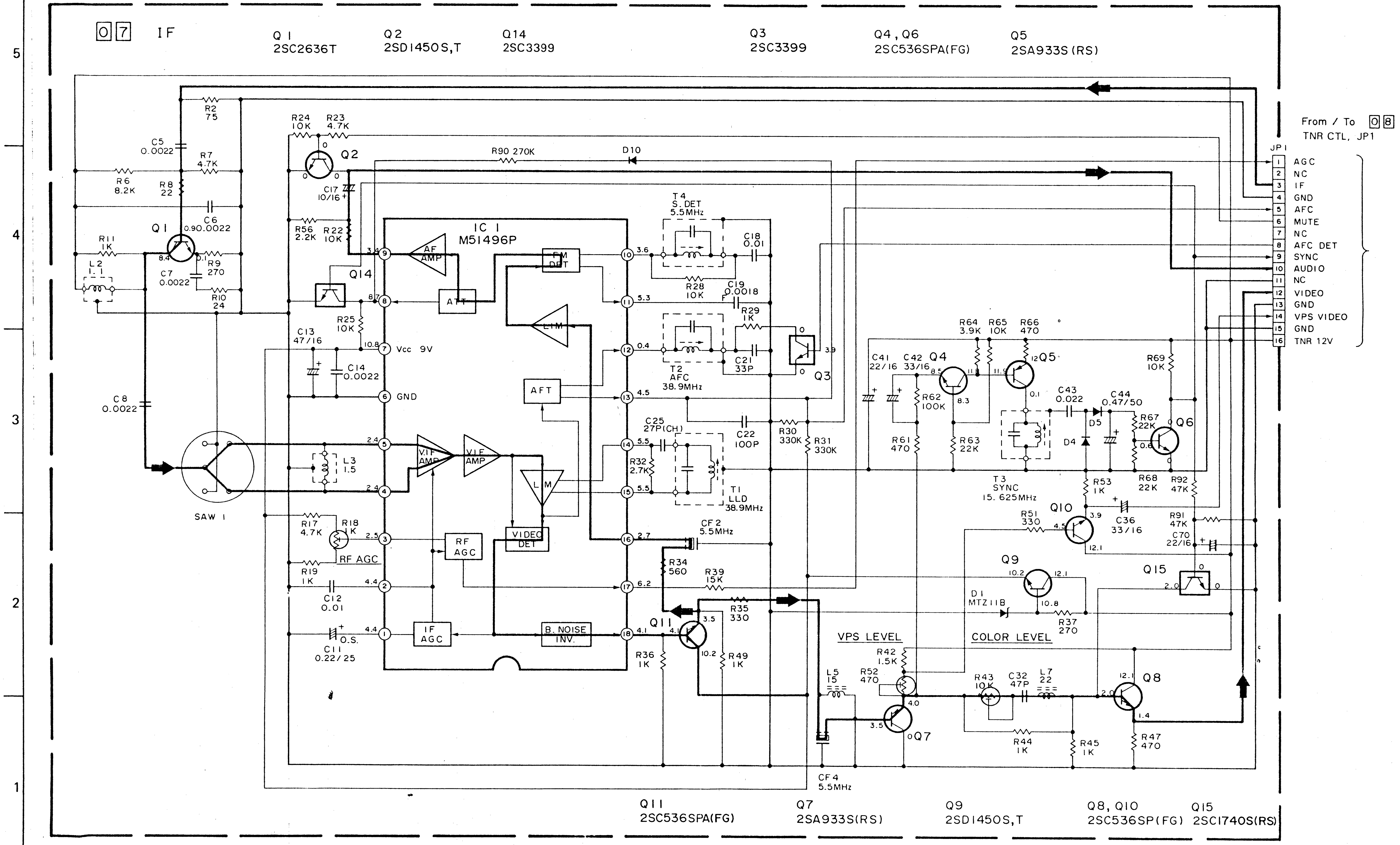
—UPPER DRUM—


CH-1 SP
4 1
UPPER DRUM
PDM3017
CH-2 SP

5
4
3
2
1

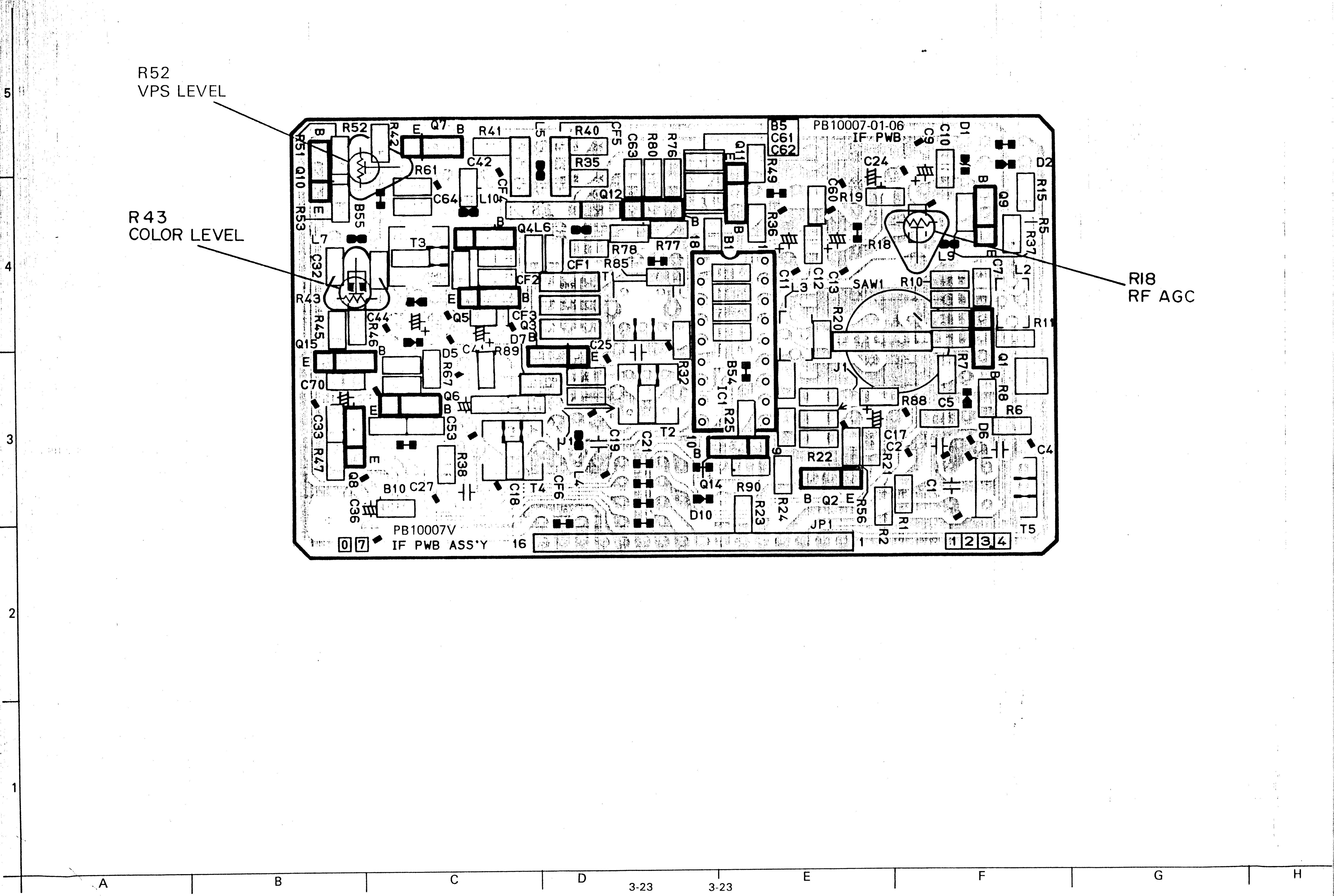
A B C D E F G H

3.22 IF SCHEMATIC DIAGRAM

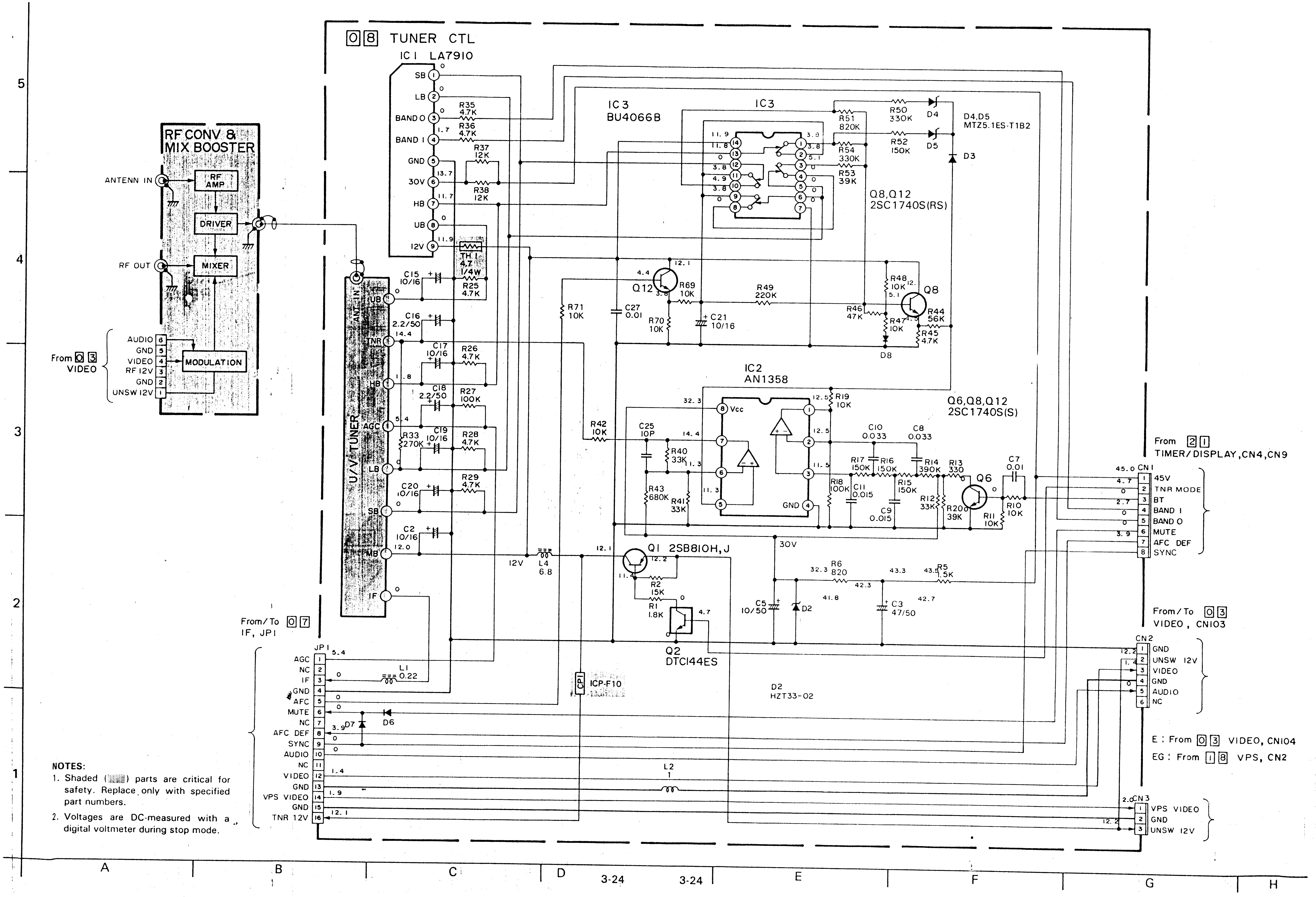

07 IF
Q1 2SC2636T
Q2 2SD1450S,T
Q14 2SC3399
Q3 2SC3399
Q4,Q6 2SC536SPA(FG)
Q5 2SA933S(RS)
From / To 08
TNR CTL, JP1
JP1
1 AGC
2 NC
3 IF
4 GND
5 AFC
6 MUTE
7 NC
8 AFC DET
9 SYNC
10 AUDIO
11 NC
12 VIDEO
13 GND
14 VPS VIDEO
15 GND
16 TNR 12V
IC1 M51496P
AF AMP
FM DET
ATT
LIM
AFT
VIF AMP
LIM
VIDEO DET
RF AGC
IF AGC
B. NOISE INV.
Vcc 9V
GND
R2 75
R24 10K
R23 4.7K
R90 270K
D10
C5 0.0022
R7 4.7K
R6 8.2K
R8 22
C6 0.0022
C17 10/16
R56 2.2K
R22 10K
R11 1K
L2 1.1
C7 0.0022
R9 270
R10 24
R25 10K
C13 47/16
C14 0.0022
C8 0.0022
SAW 1
L3 1.5
R17 4.7K
R18 1K
R19 1K
C12 0.01
C11 0.22/25
O.S.
T4 S.DET 5.5MHz
C18 0.01
R28 10K
C19 0.0018
R29 1K
C21 33P
T2 AFC 38.9MHz
C25 27P(CH)
C22 100P
R32 2.7K
T1 LLD 38.9MHz
R30 330K
R31 330K
CF2 5.5MHz
R34 560
R39 15K
R35 330
R36 1K
R49 1K
Q11
L5 15
R42 1.5K
R52 470
CF4 5.5MHz
Q7
VPS LEVEL
COLOR LEVEL
R43 10K
C32 47P
L7 22
R44 1K
R45 1K
R47 470
Q8
Q9
D1 MTZ11B
R37 270
Q15
R64 3.9K
R65 10K
R66 470
C41 22/16
C42 33/16
R62 100K
R61 470
R63 22K
C43 0.022
C44 0.47/50
D4
D5
R67 22K
R68 22K
R69 10K
R92 47K
R91 47K
C70 22/16
T3 SYNC 15.625MHz
R53 1K
R51 330
Q10
C36 33/16
Q11 2SC536SPA(FG)
Q7 2SA933S(RS)
Q9 2SD1450S,T
Q8, Q10 2SC536SP(FG)
Q15 2SC1740S(RS)
5
4
3
2
1
A
B
C
D
E
F
G
H

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

3.23 IF CIRCUIT BOARD


R52
VPS LEVEL
R43
COLOR LEVEL
R18
RF AGC
PB10007-01-06
IF PWB
PB10007V
07 IF PWB ASS'Y
B5
C61
C62
Q7
Q10
Q12
Q4
Q5
Q3
Q6
Q8
Q11
Q14
Q15
Q9
Q1
Q2
IC1
SAW1
T2
T3
T4
T5
JP1
J1
CF1
CF2
CF3
CF5
CF6
D1
D2
D5
D6
D7
D10
16
1
1
2
3
4
A
B
C
D
E
F
G
H
1
2
3
4
5

3.24 TUNER CTL SCHEMATIC DIAGRAM

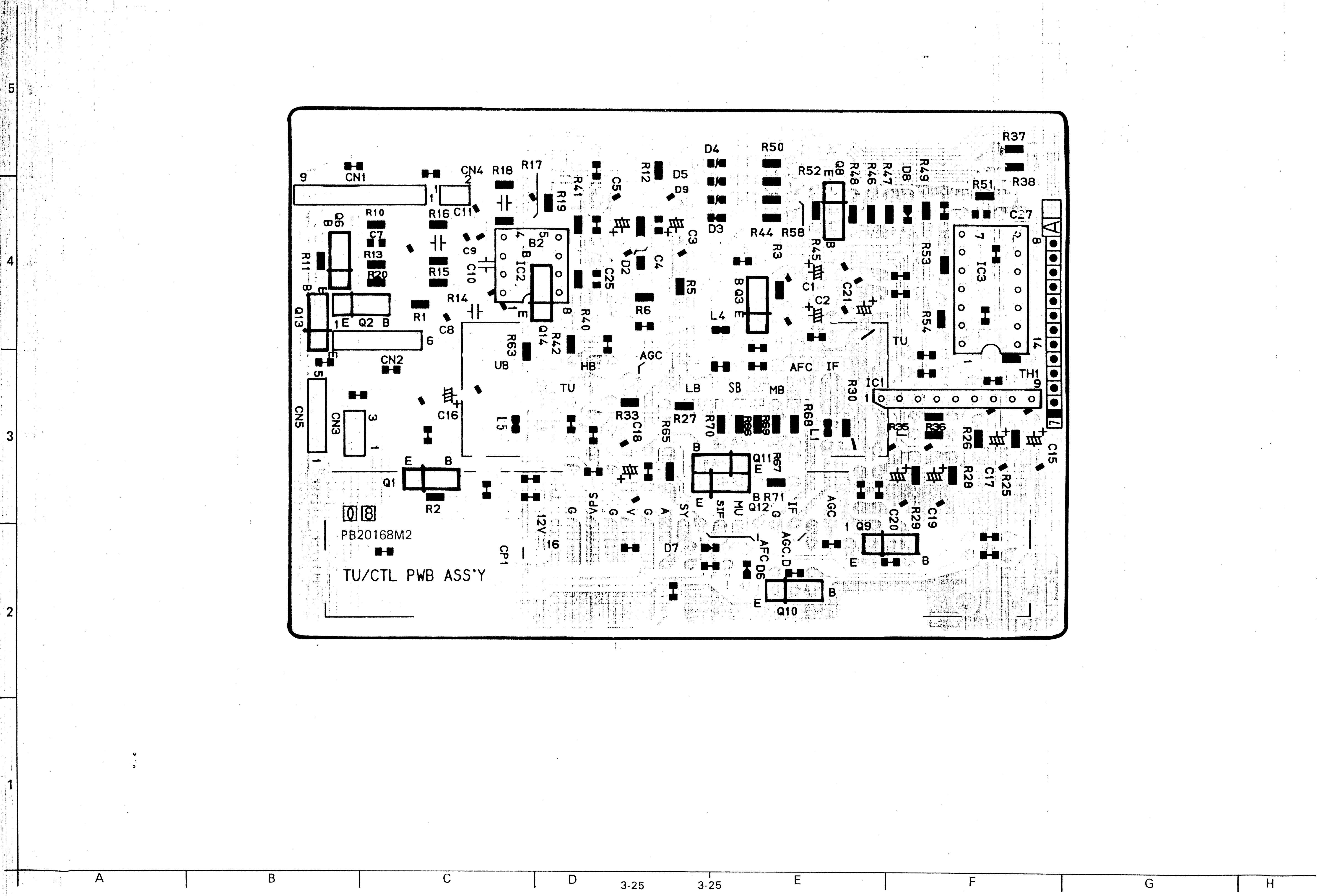


08 TUNER CTL
IC1 LA7910
SB
LB
BAND 0
BAND 1
GND
30V
HB
UB
12V
R35 4.7K
R36 4.7K
R37 12K
R38 12K
TH1 4.7 1/4W
R25 4.7K
RF CONV & MIX BOOSTER
ANTENN IN
RF AMP
DRIVER
MIXER
RF OUT
MODULATION
From 03 VIDEO
AUDIO
GND
VIDEO
RF 12V
GND
UNSW 12V
U/V TUNER
ANT IN
UB
TNR
HB
AGC
LB
SB
MB
IF
C15 10/16
C16 2.2/50
C17 10/16
C18 2.2/50
C19 10/16
C20 10/16
C2 10/16
R26 4.7K
R27 100K
R28 4.7K
R29 4.7K
R33 270K
IC3 BU4066B
IC3
R50 330K
R51 820K
R52 150K
R54 330K
R53 39K
D4
D5
D3
D4,D5 MTZ5.1ES-T1B2
Q8,Q12 2SC1740S(RS)
Q12
R69 10K
R70 10K
C21 10/16
R49 220K
R48 10K
Q8
R46 47K
R47 10K
R44 56K
R45 4.7K
D8
R71 10K
C27 0.01
IC2 AN1358
Vcc
GND
R19 10K
Q6,Q8,Q12 2SC1740S(S)
R42 10K
C25 10P
R40 33K
R43 680K
R41 33K
C10 0.033
C8 0.033
R17 150K
R16 150K
R14 390K
R13 330
C7 0.01
Q6
R18 100K
C11 0.015
R15 150K
C9 0.015
R12 33K
R200 39K
R11 10K
R10 10K
From 21 TIMER/DISPLAY,CN4,CN9
CN1
45V
TNR MODE
BT
BAND 1
BAND 0
MUTE
AFC DEF
SYNC
30V
Q1 2SB810H,J
12V
L4 6.8
R6 820
R5 1.5K
R2 15K
R1 1.8K
C5 10/50
D2
C3 47/50
Q2 DTC144ES
D2 HZT33-02
From/To 03 VIDEO, CN103
CN2
GND
UNSW 12V
VIDEO
GND
AUDIO
NC
From/To 07 IF, JP1
JP1
AGC
NC
IF
GND
AFC
MUTE
NC
AFC DEF
SYNC
AUDIO
NC
VIDEO
GND
VPS VIDEO
GND
TNR 12V
L1 0.22
D6
D7
CP1 ICP-F10
L2 1
CN3
VPS VIDEO
GND
UNSW 12V
E : From 03 VIDEO, CN104
EG : From 18 VPS, CN2
A
B
C
D
E
F
G
H
1
2
3
4
5

NOTES:

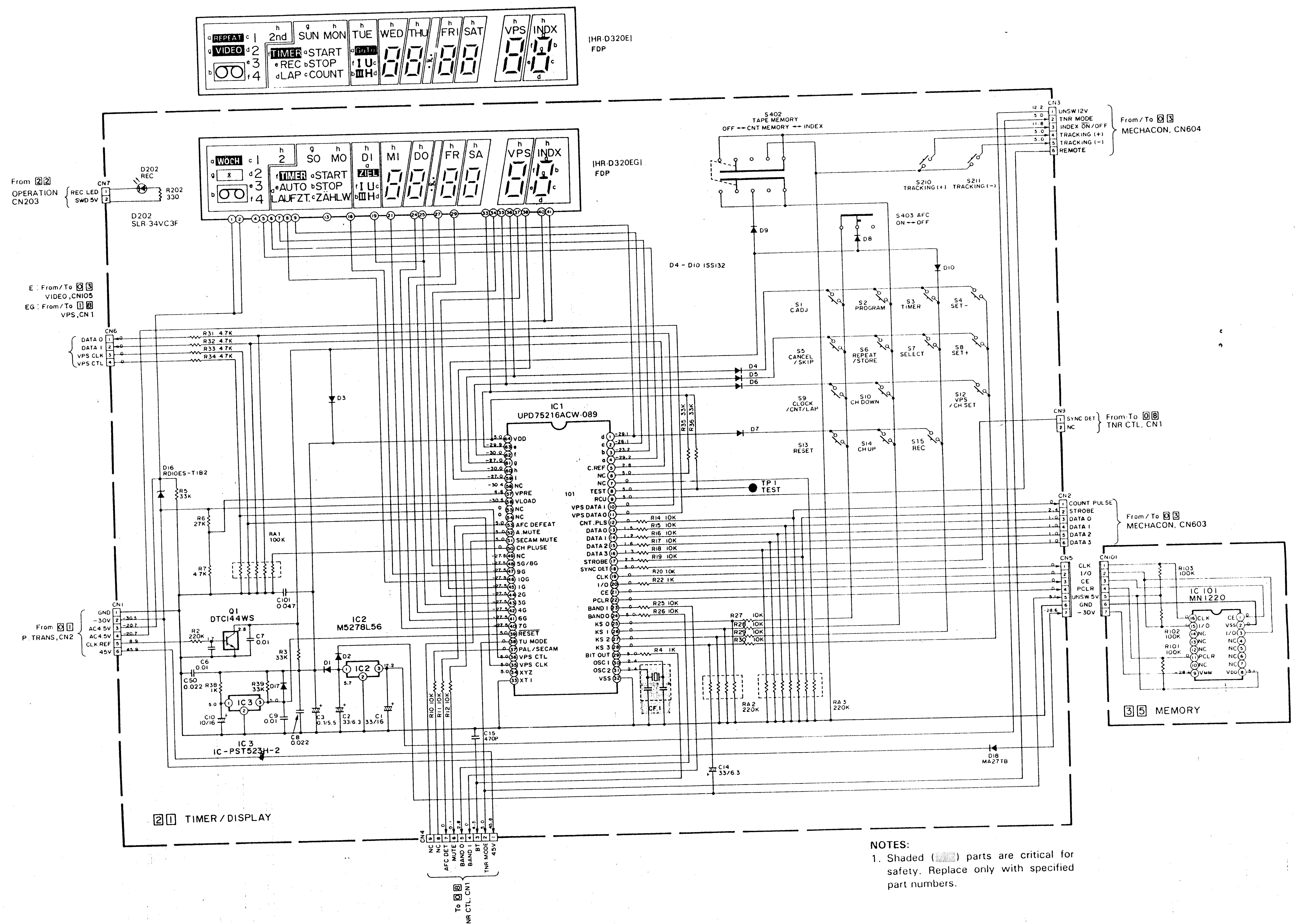
1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.25 TUNER CTL CIRCUIT BOARD



CN1
9
1
CN4
2
R18
R17
R19
R41
C5
R12
D5
D9
D4
D3
R50
R52
Q8
R48
R46
R47
D8
R49
R37
R51
R38
C27
R16
C11
R10
C7
R13
R20
R15
Q6
R11
C9
C10
IC2
B2
R14
C8
R1
Q2
Q13
Q14
R63
R42
R40
R6
R5
C25
D2
C4
C3
R44
R58
R3
R45
C1
C2
C21
Q3
L4
R53
R54
IC3
TU
TH1
IC1
CN2
CN5
CN3
C16
L5
UB
HB
AGC
TU
LB
SB
MB
AFC
IF
R30
R33
C18
R27
R65
R70
R66
R69
R68
L1
R35
R36
R26
C15
Q11
R67
R71
Q12
R28
C17
R25
C19
R29
C20
Q9
Q1
R2
Q10
D6
D7
CP1
12V
16
G
VPS
V
A
SY
SIF
MU
AGC.D
PB20168M2
08
TU/CTL PWB ASS'Y
E
B
1
2
3
4
5
A
B
C
D
E
F
G
H

3.26 TIMER/DISPLAY AND MEMORY SCHEMATIC DIAGRAMS

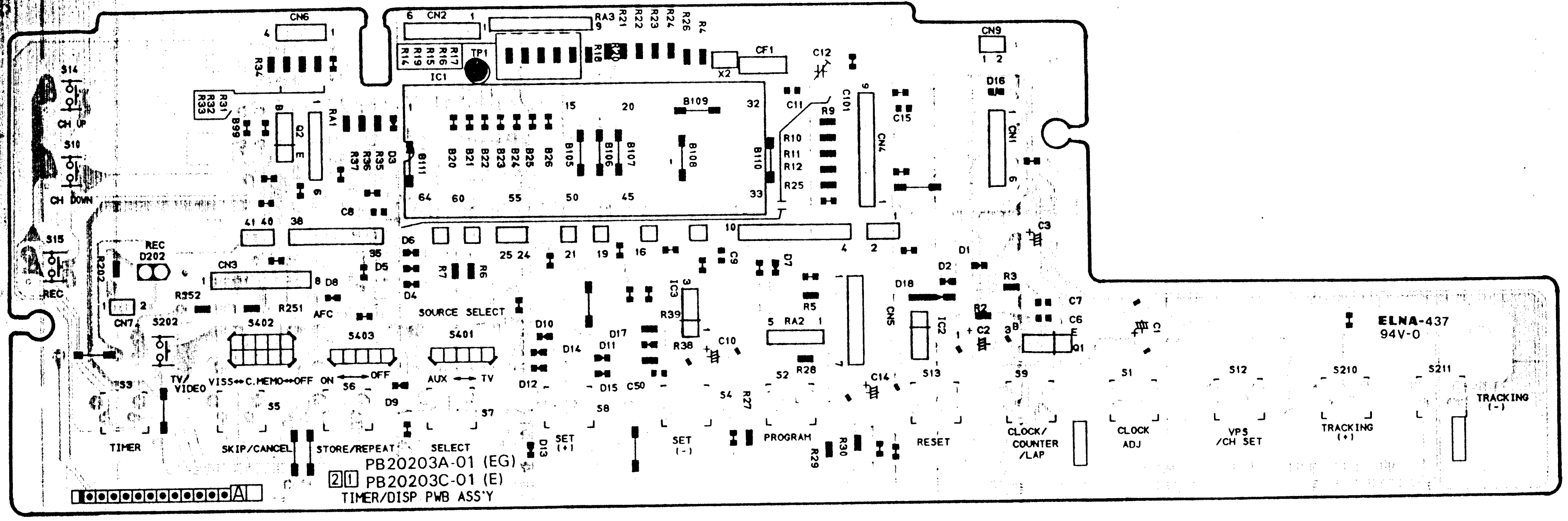


[HR-D320E]
FDP
REPEAT
VIDEO
2nd
SUN MON TUE WED THU FRI SAT
TIMER
START
REC STOP
LAP COUNT
VPS INDX
[HR-D320EG]
FDP
WOCH
SO MO DI MI DO FR SA
TIMER
AUTO
START
STOP
AUFZT.
ZÄHLW
ZIEL
From 22
OPERATION
CN203
CN7
REC LED
SWD 5V
D202
REC
R202
330
D202
SLR-34VC3F
E : From/To 03
VIDEO, CN105
EG : From/To 18
VPS, CN1
CN6
DATA O
DATA I
VPS CLK
VPS CTL
R31 4.7K
R32 4.7K
R33 4.7K
R34 4.7K
D3
D16
RD10ES-T1B2
R5
33K
R6
27K
R7
4.7K
RA1
100K
C101
0.047
CN1
From 01
P. TRANS, CN2
GND
-30V
AC4.5V
AC4.5V
CLK REF
45V
Q1
DTC144WS
R2
220K
C7
0.01
C6
0.01
C50
0.022
R38
1K
R39
33K
D17
IC3
C10
10/16
C9
0.01
C8
0.022
IC3
IC-PST523H-2
IC2
M5278L56
R3
33K
D1
D2
C3
0.1/5.5
C2
33/6.3
C1
33/16
R10 10K
R11 10K
R12 10K
C15
470P
IC1
UPD75216ACW-089
VDD
NC
VPRE
VLOAD
AFC DEFEAT
A.MUTE
SECAM MUTE
CH PLUSE
5G/8G
9G
10G
1G
2G
3G
4G
6G
7G
RESET
TU MODE
PAL/SECAM
VPS CTL
VPS CLK
XYZ
XT1
C.REF
TEST
RCU
VPS DATA I
VPS DATA O
CNT.PLS
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
SYNC DET
CLK
I/O
CE
PCLR
BAND I
BAND 0
KS 0
KS 1
KS 2
KS 3
BIT OUT
OSC 1
OSC 2
VSS
R35 33K
R36 33K
R14 10K
R15 10K
R16 10K
R17 10K
R18 10K
R19 10K
R20 10K
R22 1K
R25 10K
R26 10K
R27 10K
R28 10K
R29 10K
R30 10K
R4 1K
CF1
RA2
220K
RA3
220K
C14
33/6.3
TP1
TEST
D18
MA27TB
S402
TAPE MEMORY
OFF ↔ CNT MEMORY ↔ INDEX
S210
TRACKING (+)
S211
TRACKING (-)
S403 AFC
ON ↔ OFF
D8
D9
D10
D4 - D10 1SS132
S1
C.ADJ
S2
PROGRAM
S3
TIMER
S4
SET-
S5
CANCEL
/SKIP
S6
REPEAT
/STORE
S7
SELECT
S8
SET+
S9
CLOCK
/CNT/LAP
S10
CH DOWN
S12
VPS
/CH SET
S13
RESET
S14
CH UP
S15
REC
D4
D5
D6
D7
CN3
UNSW 12V
TNR MODE
INDEX ON/OFF
TRACKING (+)
TRACKING (-)
REMOTE
From/To 03
MECHACON, CN604
CN9
SYNC DET
NC
From To 08
TNR CTL, CN1
CN2
COUNT PULSE
STROBE
DATA 0
DATA 1
DATA 2
DATA 3
From/To 03
MECHACON, CN603
CN5
CN101
CLK
I/O
CE
PCLR
UNSW 5V
GND
-30V
R103
100K
R102
100K
R101
100K
IC 101
MN1220
VSS
VMM
VDD
35 MEMORY
21 TIMER/DISPLAY
CN4
NC
NC
AFC DET
MUTE
BAND 0
BAND 1
BT
TNR MODE
45V
To 08
TNR CTL, CN1

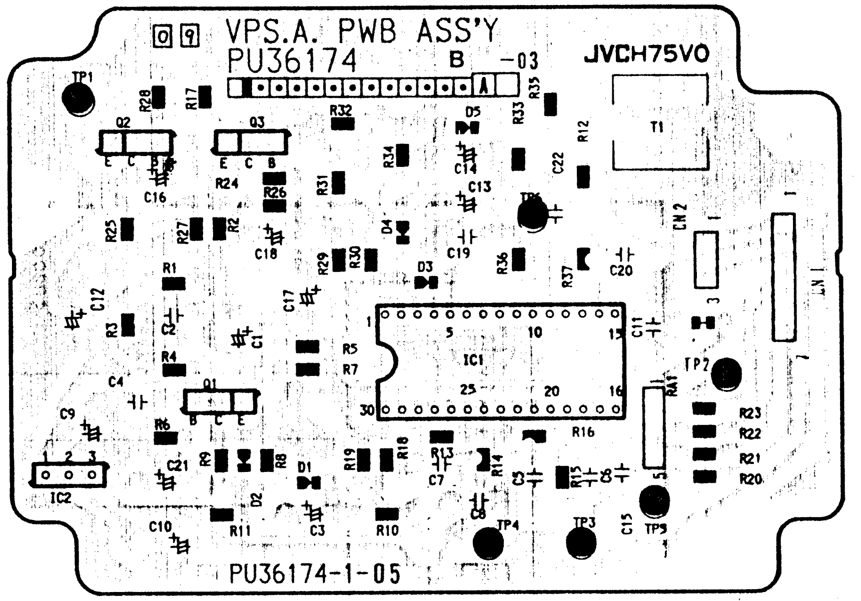
NOTES:
1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

3.27 TIMER/DISPLAY, VPS, OPERATION AND MEMORY CIRCUIT BOARDS

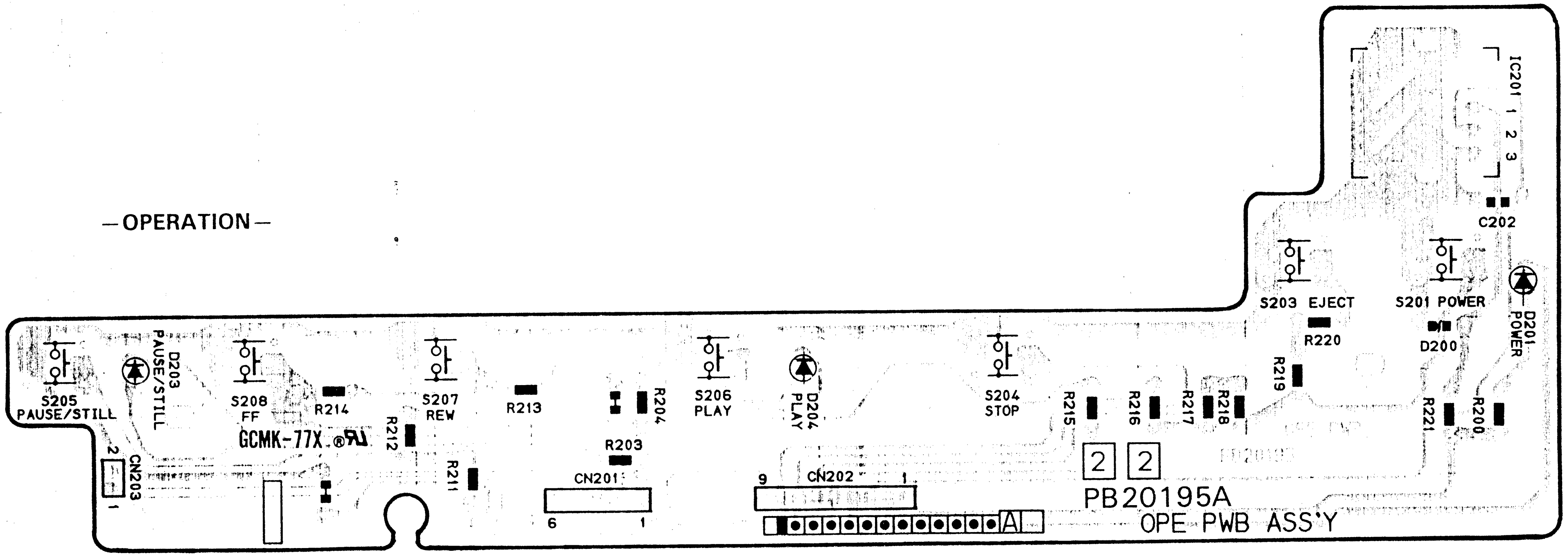
—TIMER/DISPLAY—


S14
CH
S10
CH DOWN
S15
REC
REC
D202
CN7
S202
S402
S403
S401
SOURCE SELECT
TV/VIDEO
VISS↔C.MEMO↔OFF
ON ↔ OFF
AUX ↔ TV
S3
S5
S6
S7
S8
S4
S2
S13
S9
S1
S12
S210
S211
TIMER
SKIP/CANCEL
STORE/REPEAT
SELECT
SET (+)
SET (-)
PROGRAM
RESET
CLOCK/COUNTER/LAP
CLOCK ADJ
VPS /CH SET
TRACKING (+)
TRACKING (-)
IC1
IC2
IC3
TP1
CN1
CN2
CN3
CN4
CN5
CN6
CN9
X2
CF1
ELNA-437
94V-0
2 1 PB20203A-01 (EG)
PB20203C-01 (E)
TIMER/DISP PWB ASS'Y

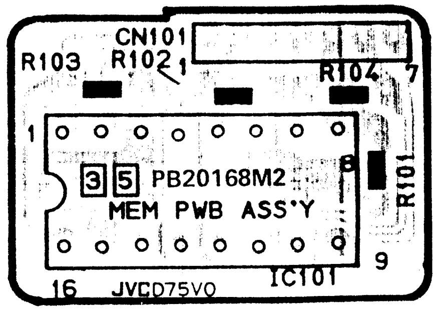
—VPS (EG ONLY)—


0 9 VPS.A. PWB ASS'Y
PU36174 B -03
JVCH75VO
TP1
TP2
TP3
TP4
TP5
Q1
Q2
Q3
IC1
IC2
T1
CN2
PU36174-1-05

—OPERATION—

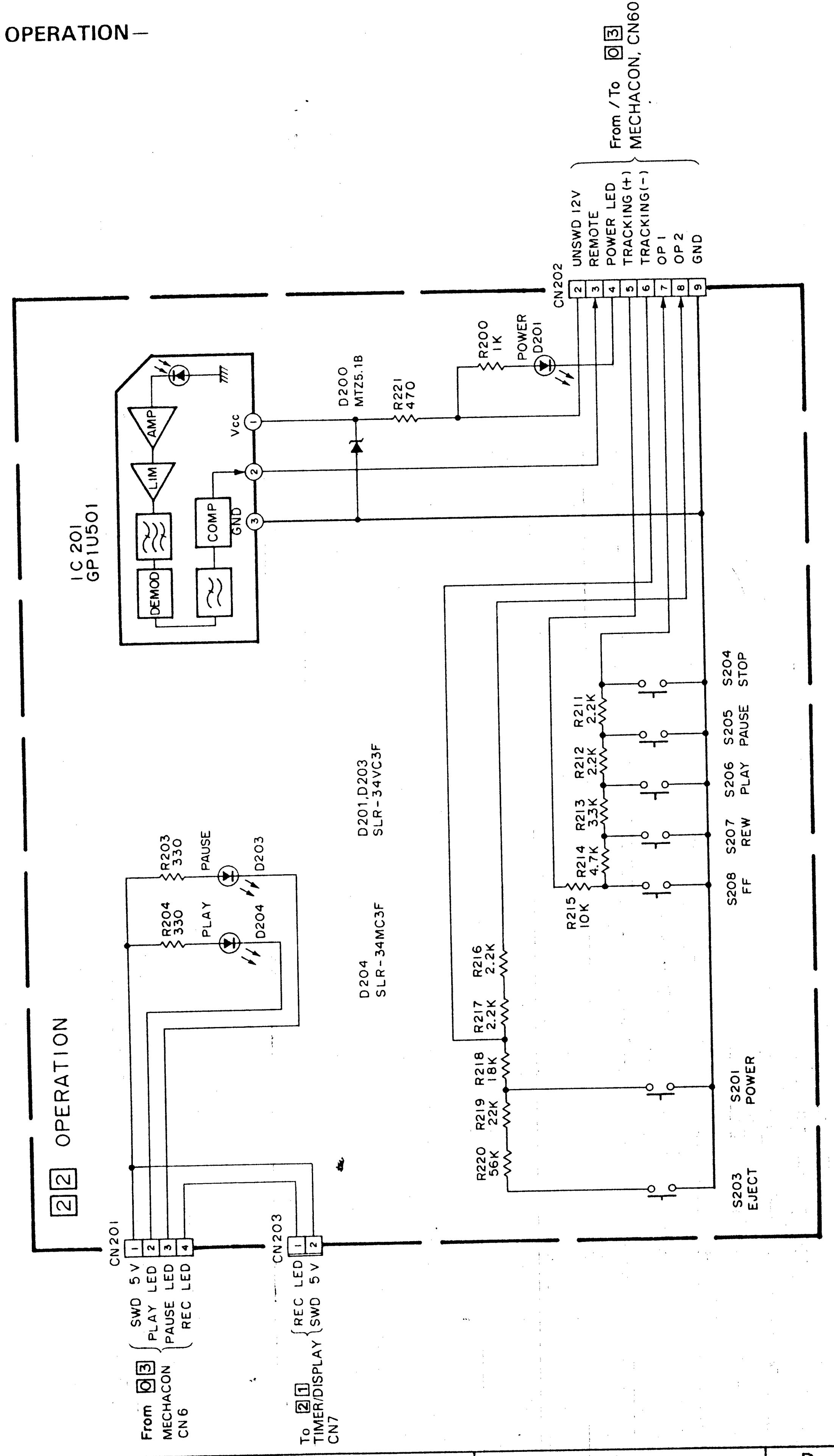

IC201
1 2 3
C202
S203 EJECT
S201 POWER
D201 POWER
R220
D200
R219
S205 PAUSE/STILL
D203 PAUSE/STILL
S208 FF
R214
S207 REW
R213
R204
S206 PLAY
D204 PLAY
S204 STOP
R215
R216
R217
R218
R221
R200
GCMK-77X
R212
R211
R203
CN201
6
1
9
CN202
1
CN203
2
1
2 2
PB20195A
OPE PWB ASS'Y

—MEMORY—


CN101
R103
R102
1
R104
7
1
R101
8
9
3 5 PB20168M2
MEM PWB ASS'Y
16
JVCD75VO
IC101

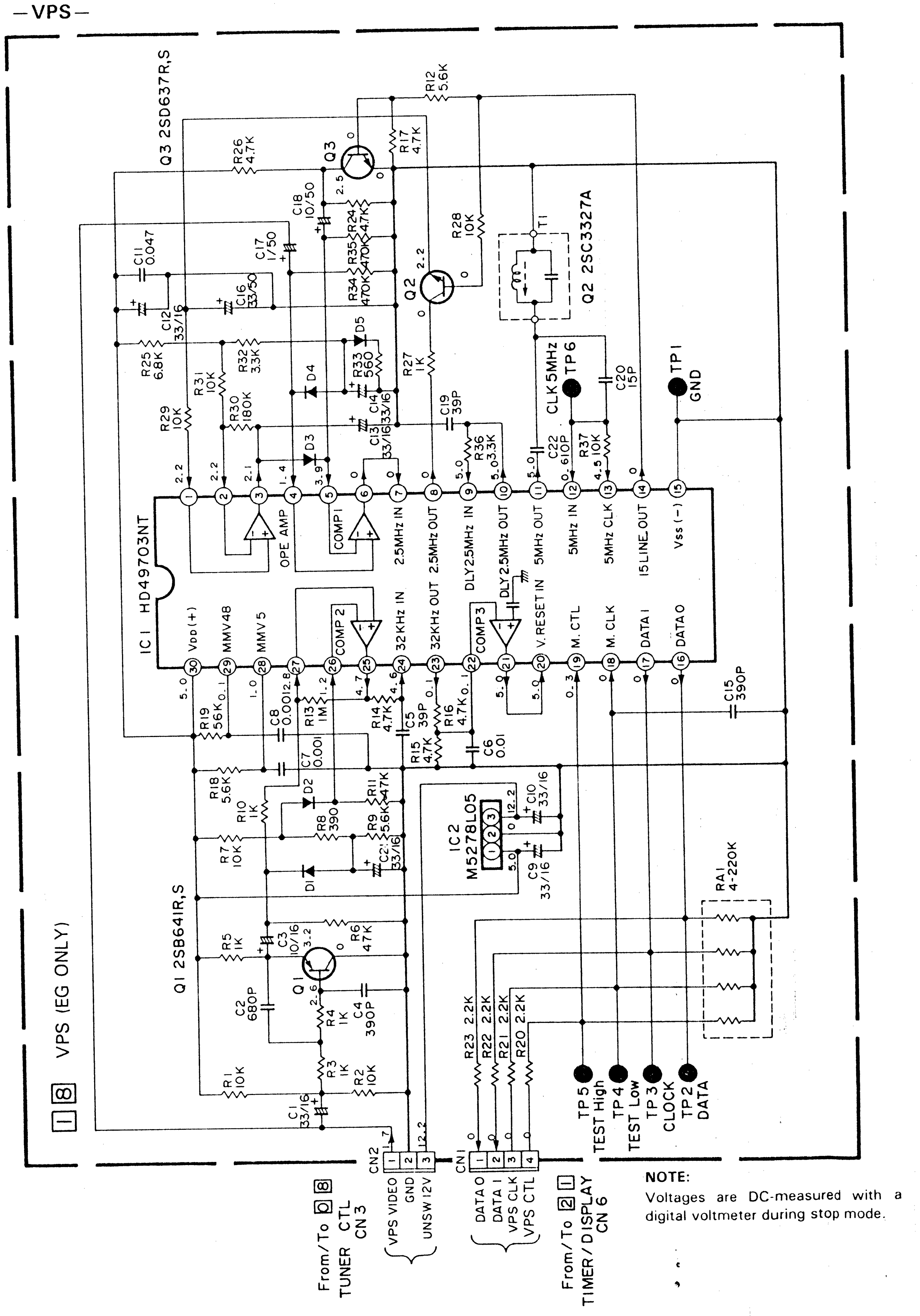
3.28 OPERATION AND VPS SCHEMATIC DIAGRAMS

—OPERATION—



2 2 OPERATION
IC 201
GP1U501
AMP
LIM
COMP
DEMOD
Vcc
GND
D200
MTZ5.1B
R221
470
R200
1K
POWER
D201
CN202
UNSWD 12V
REMOTE
POWER LED
TRACKING(+)
TRACKING(−)
OP 1
OP 2
GND
From/To 0 3
MECHACON, CN603
R211 2.2K
R212 2.2K
R213 3.3K
R214 4.7K
R215 10K
R216 2.2K
R217 2.2K
R218 18K
R219 22K
R220 56K
S204 STOP
S205 PAUSE
S206 PLAY
S207 REW
S208 FF
S201 POWER
S203 EJECT
D201,D203
SLR-34VC3F
D204
SLR-34MC3F
R203 330
PAUSE
D203
R204 330
PLAY
D204
CN201
SWD 5V
PLAY LED
PAUSE LED
REC LED
From 0 3
MECHACON
CN6
CN203
REC LED
SWD 5V
To 2 1
TIMER/DISPLAY
CN7

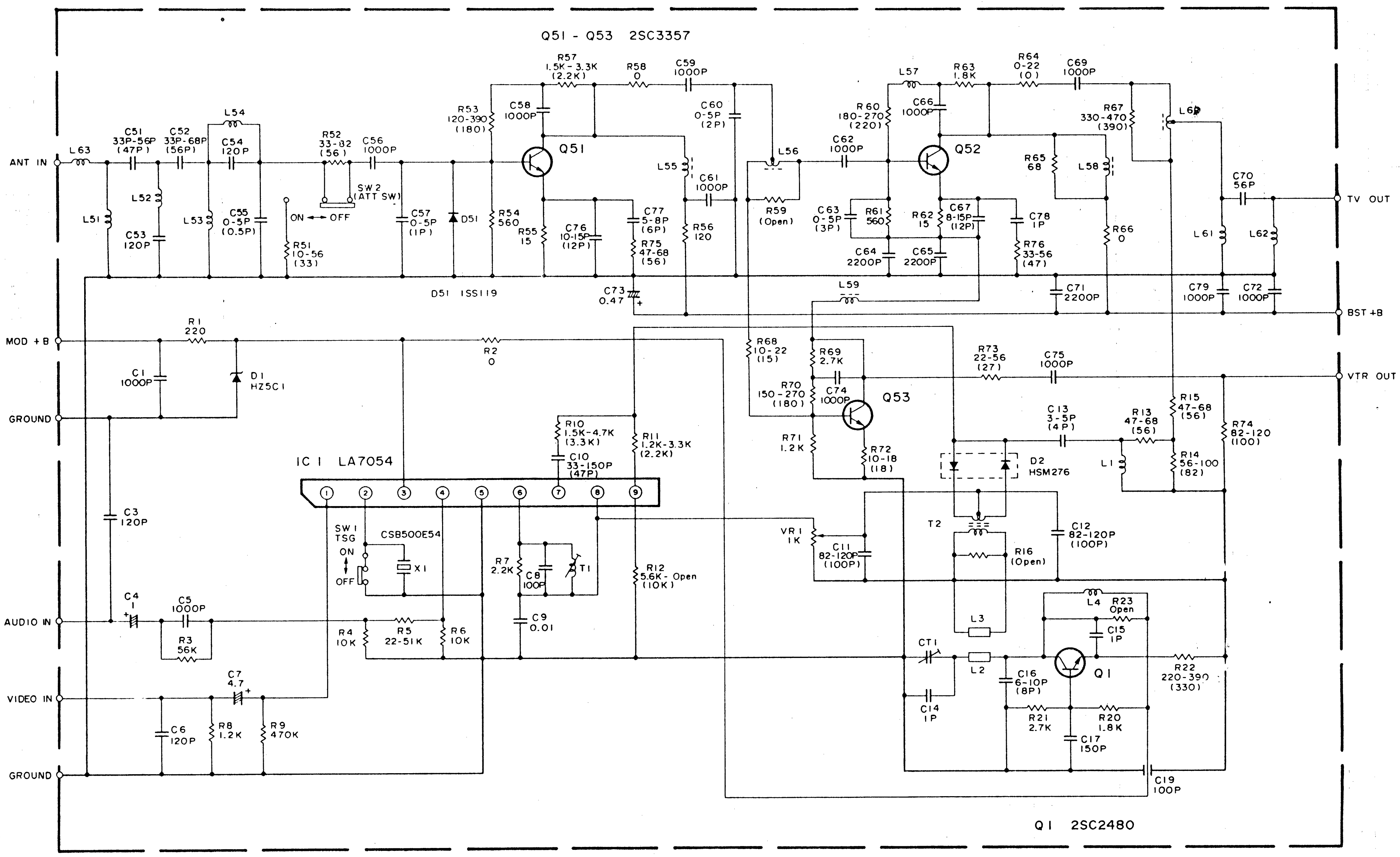
—VPS—



1 8 VPS (EG ONLY)
Q3 2SD637R,S
Q2 2SC3327A
Q1 2SB641R,S
IC1 HD49703NT
IC2 M5278L05
R12 5.6K
R17 4.7K
R26 4.7K
R24 47K
R35 470K
R34 470K
R28 10K
R27 1K
R25 6.8K
R31 10K
R32 3.3K
R30 180K
R33 560
R29 10K
R36 3.3K
R37 10K
R19 56K
R13 1M
R14 4.7K
R16 4.7K
R15 4.7K
R18 5.6K
R10 1K
R11 47K
R8 390
R9 5.6K
R7 10K
R5 1K
R6 47K
R4 1K
R3 1K
R2 10K
R1 10K
R23 2.2K
R22 2.2K
R21 2.2K
R20 2.2K
RA1 4-220K
C11 0.047
C12 33/16
C16 33/50
C17 1/50
C18 10/50
C13 33/16
C14 33/16
C19 39P
C20 15P
C22 61P
C15 390P
C8 0.001
C7 0.001
C5 39P
C6 0.01
C10 33/16
C9 33/16
C21 33/16
C3 10/16
C2 680P
C4 390P
C1 33/16
D1
D2
D3
D4
D5
T1
TP6 CLK 5MHz
TP1 GND
TP5 TEST High
TP4 TEST Low
TP3 CLOCK
TP2 DATA
OPE AMP
COMP1
COMP 2
COMP3
VDD(+)
MMV48
MMV5
32KHz IN
32KHz OUT
2.5MHz IN
2.5MHz OUT
DLY2.5MHz IN
DLY2.5MHz OUT
V.RESET IN
5MHz OUT
5MHz IN
5MHz CLK
15LINE OUT
Vss(−)
M. CTL
M. CLK
DATA I
DATA O
CN2
VPS VIDEO
GND
UNSW 12V
From/To 0 8
TUNER CTL
CN3
CN1
DATA O
DATA I
VPS CLK
VPS CTL
From/To 2 1
TIMER/DISPLAY
CN6

NOTE:
Voltages are DC-measured with a digital voltmeter during stop mode.

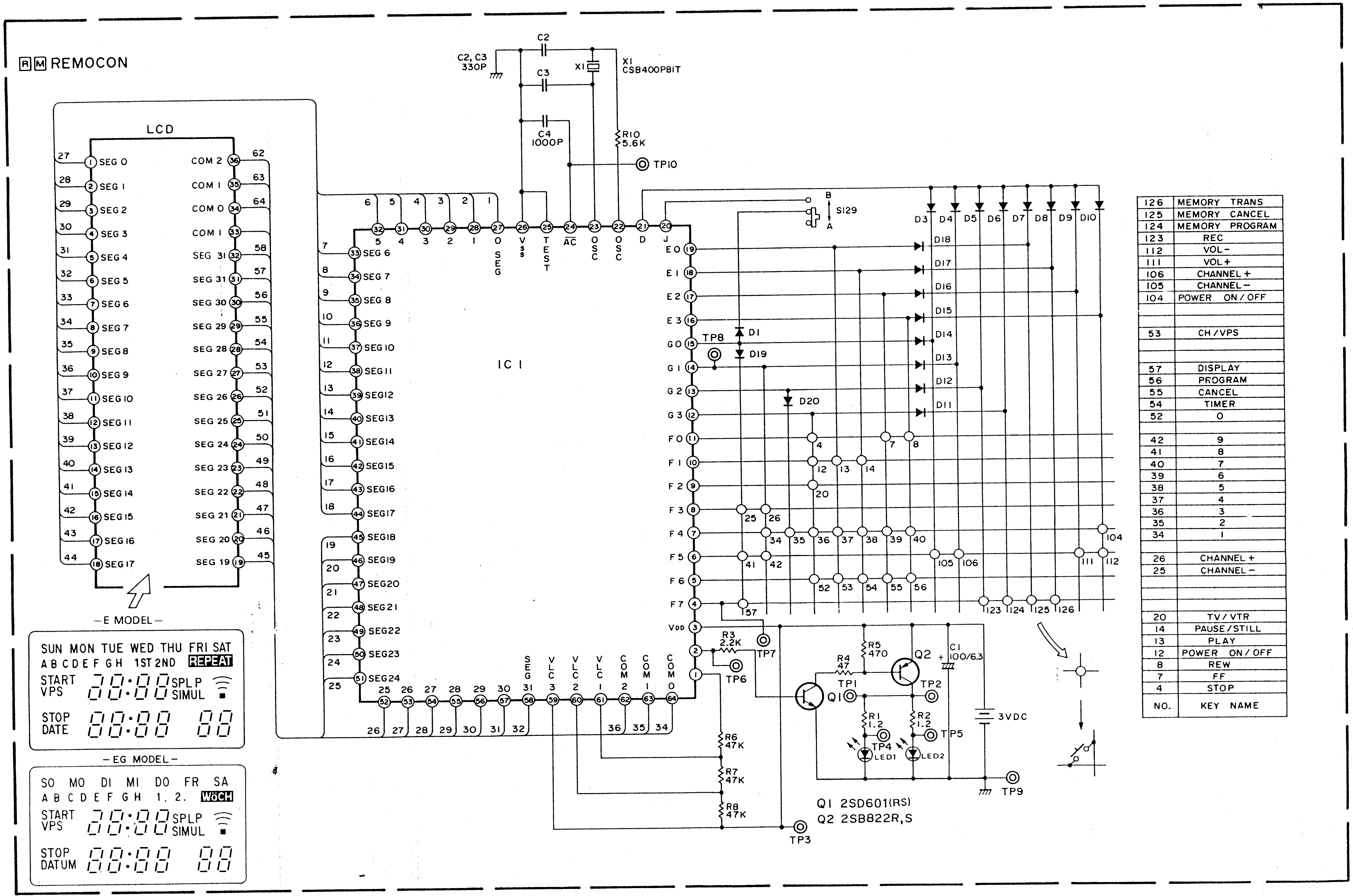
3-29 RF CONVERTER AND MIX BOOSTER SCHEMATIC DIAGRAM


Q51 - Q53 2SC3357
ANT IN
MOD +B
GROUND
AUDIO IN
VIDEO IN
GROUND
TV OUT
BST +B
VTR OUT
L63
C51 33P-56P (47P)
C52 33P-68P (56P)
L54
C54 120P
L51
L52
C53 120P
L53
C55 0-5P (0.5P)
R52 33-82 (56)
C56 1000P
SW2 (ATT SW)
ON ← OFF
R51 10-56 (33)
C57 0-5P (1P)
D51
D51 1SS119
R53 120-390 (180)
C58 1000P
R57 1.5K-3.3K (2.2K)
R58 0
C59 1000P
Q51
R54 560
R55 15
C76 10-15P (12P)
C77 5-8P (6P)
R75 47-68 (56)
C73 0.47
L55
C60 0-5P (2P)
C61 1000P
R56 120
L56
R59 (Open)
C62 1000P
L57
R60 180-270 (220)
C66 1000P
R63 1.8K
R64 0-22 (0)
C69 1000P
Q52
C63 0-5P (3P)
R61 560
R62 15
C67 8-15P (12P)
C78 1P
R76 33-56 (47)
C64 2200P
C65 2200P
R65 68
L58
R66 0
R67 330-470 (390)
L60
C70 56P
L61
L62
C71 2200P
C79 1000P
C72 1000P
L59
R1 220
C1 1000P
D1 HZ5C1
R2 0
C3 120P
C4 1
C5 1000P
R3 56K
C6 120P
C7 4.7
R8 1.2K
R9 470K
R4 10K
R5 22-51K
R6 10K
IC1 LA7054
SW1 TSG
ON
OFF
CSB500E54
X1
R7 2.2K
C8 100P
T1
C9 0.01
R10 1.5K-4.7K (3.3K)
C10 33-150P (47P)
R11 1.2K-3.3K (2.2K)
R12 5.6K- Open (10K)
R68 10-22 (15)
R69 2.7K
R70 150-270 (180)
C74 1000P
Q53
R71 1.2K
R72 10-18 (18)
R73 22-56 (27)
C75 1000P
C13 3-5P (4P)
R13 47-68 (56)
R15 47-68 (56)
R14 56-100 (82)
R74 82-120 (100)
D2 HSM276
L1
VR1 1K
C11 82-120P (100P)
T2
R16 (Open)
C12 82-120P (100P)
L4
R23 Open
C15 1P
L3
CT1
L2
C14 1P
C16 6-10P (8P)
Q1
R22 220-390 (330)
R21 2.7K
R20 1.8K
C17 150P
C19 100P
Q1 2SC2480

NOTES:

1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
   Avoid replacing individual parts.
   Replace the entire unit only.

3.30 REMOTE CONTROL SCHEMATIC DIAGRAM


RM REMOCON
LCD
IC 1
C2
C2, C3 330P
C3
C4 1000P
X1
X1 CSB400P8IT
R10 5.6K
TP10
S129
B
A
D1
D19
D20
TP8
D3 D4 D5 D6 D7 D8 D9 D10
D11 D12 D13 D14 D15 D16 D17 D18
COM 2
COM 1
COM 0
SEG 0
SEG 17
SEG 31
SEG 19
OSC
VSS
TEST
AC
E0 E1 E2 E3 G0 G1 G2 G3 F0 F1 F2 F3 F4 F5 F6 F7
VDD
VLC 3
VLC 2
VLC 1
R3 2.2K
TP7
TP6
R4 47
R5 470
Q1
Q2
C1 100/6.3
TP1
TP2
R1 1.2
R2 1.2
TP4
TP5
LED1
LED2
3VDC
TP9
R6 47K
R7 47K
R8 47K
TP3
Q1 2SD601(RS)
Q2 2SB822R,S
-E MODEL-
SUN MON TUE WED THU FRI SAT
A B C D E F G H 1ST 2ND REPEAT
START VPS
SPLP SIMUL
STOP DATE
-EG MODEL-
SO MO DI MI DO FR SA
A B C D E F G H 1. 2. WöCH
START VPS
SPLP SIMUL
STOP DATUM

126	MEMORY TRANS
125	MEMORY CANCEL
124	MEMORY PROGRAM
123	REC
112	VOL-
111	VOL+
106	CHANNEL +
105	CHANNEL -
104	POWER ON / OFF
53	CH / VPS
57	DISPLAY
56	PROGRAM
55	CANCEL
54	TIMER
52	0
42	9
41	8
40	7
39	6
38	5
37	4
36	3
35	2
34	1
26	CHANNEL +
25	CHANNEL -
20	TV / VTR
14	PAUSE / STILL
13	PLAY
12	POWER ON / OFF
8	REW
7	FF
4	STOP
NO.	KEY NAME

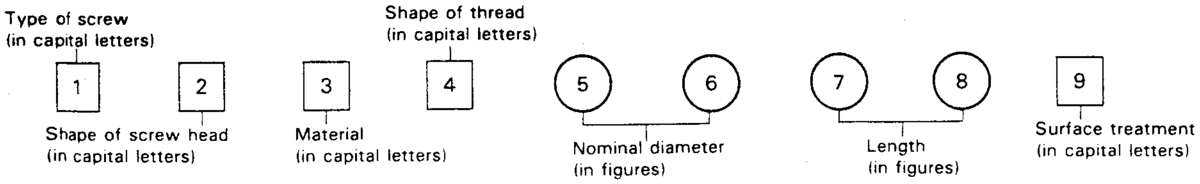
NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.

SECTION 4
EXPLODED VIEWS AND PARTS LIST

4.1 STANDARD PART NUMBER CODING

4.1.1 Screw coding

Standard screw part numbers are as follows.

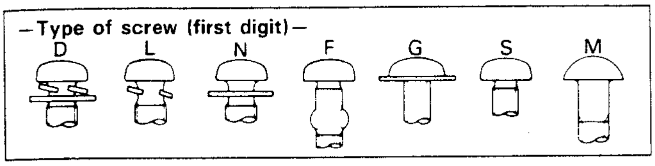

Type of screw
(in capital letters)
Shape of thread
(in capital letters)
1
2
3
4
5
6
7
8
9
Shape of screw head
(in capital letters)
Material
(in capital letters)
Nominal diameter
(in figures)
Length
(in figures)
Surface treatment
(in capital letters)

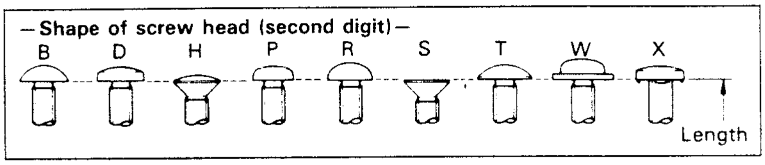
Type of screw (first digit)

S Normal screws
D Assembled machine screws (with plain and spring washers)
L 〃 (with spring washer)
N 〃 (with plain washer)
F Feather screws
G Washer head tapping screws
M Wood screws

Shape of screw head (second digit)

B Brazier head
D Binding head
H Oval countersunk head
P Pan head
R Round head
S Flat head
T Truss head
W Washer head (machine screws)
X Toothed head


—Type of screw (first digit)—
D
L
N
F
G
S
M

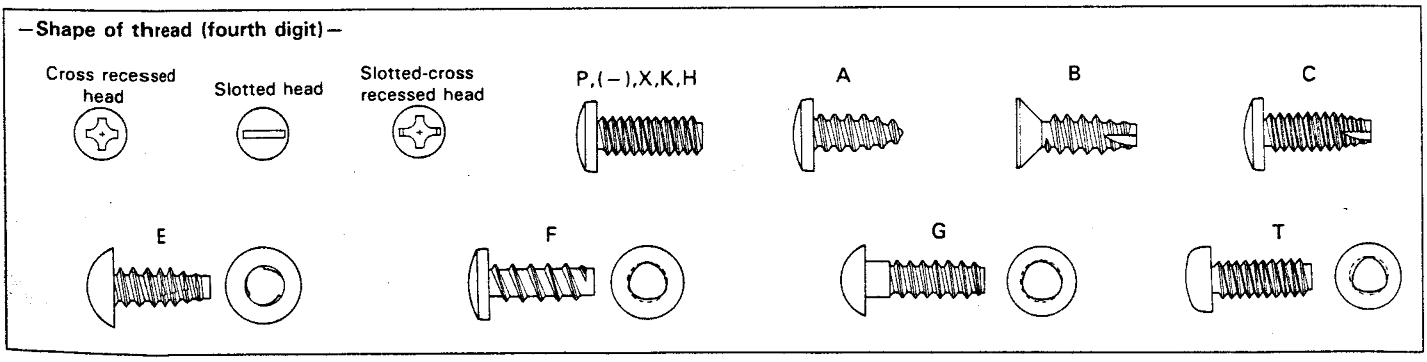

—Shape of screw head (second digit)—
B
D
H
P
R
S
T
W
X
Length

Material (third digit)

S Steel
E Stainless steel
C Cast iron
U Copper
B Brass
P Phosphor bronze
N Nickel silver
Y Cast brass
A Aluminum
Z Zinc alloy
K Polycarbonate

Shape of thread (fourth digit)

P Cross recessed head screws
(−) Slotted head machine screws
X Slotted-cross recessed head machine screws
K Cross recessed head machine screws for precision equipment (type 1)
H 〃 (type 3)
A Cross recessed head tapping screws (type 1)
B 〃 (type 2)
C 〃 (type 3)
E Cross recessed head special tapping screws (brand : evertight)
F 〃 (brand : P-tight)
T 〃 (brand : taptight)
G 〃


—Shape of thread (fourth digit)—
Cross recessed head
Slotted head
Slotted-cross recessed head
P,(−),X,K,H
A
B
C
E
F
G
T

Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

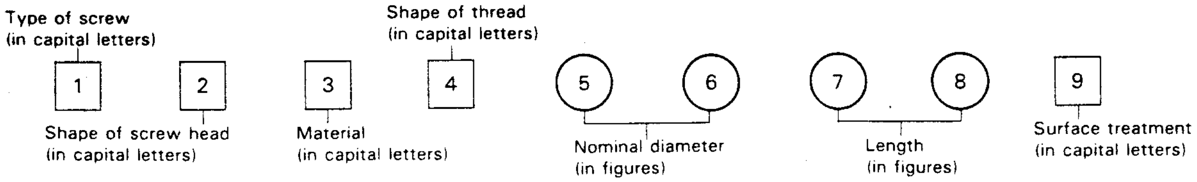
Z Dichromate treatment after galvanizing (MFZn II-C)
N Nickel plating (MFNiII, MFNiI)
R Chromium plating (MBCrII, MBCrI)
G Silver plating (SP4)
B Black coating after plating
F Blackening of iron (FB)
M Blackening after galvanizing
K Pickling of brass (PF2)
P Phosphate treatment
W Uni-chrome plating
L Coated with transparent paint
A Colored red after galvanizing (MFZnII-C)
C Colored blue after galvanizing (MFZzII-C)
T Colored green after galvanizing (MFZnII-C)
V Colored purple after galvanizing (MFZnII-C)

SECTION 4
EXPLODED VIEWS AND PARTS LIST

4.1 STANDARD PART NUMBER CODING

4.1.1 Screw coding

Standard screw part numbers are as follows.

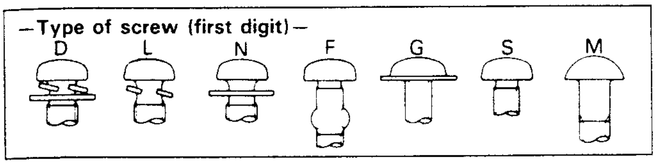

Type of screw
(in capital letters)
Shape of thread
(in capital letters)
1
2
3
4
5
6
7
8
9
Shape of screw head
(in capital letters)
Material
(in capital letters)
Nominal diameter
(in figures)
Length
(in figures)
Surface treatment
(in capital letters)

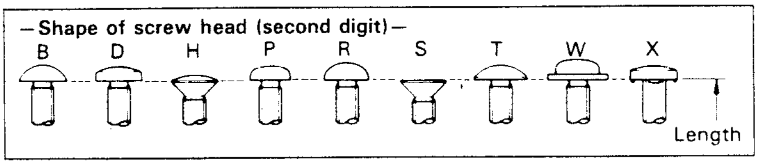
Type of screw (first digit)

S	Normal screws
D	Assembled machine screws (with plain and spring washers)
L	″ (with spring washer)
N	″ (with plain washer)
F	Feather screws
G	Washer head tapping screws
M	Wood screws

Shape of screw head (second digit)

B	Brazier head
D	Binding head
H	Oval countersunk head
P	Pan head
R	Round head
S	Flat head
T	Truss head
W	Washer head (machine screws)
X	Toothed head


—Type of screw (first digit)—
D
L
N
F
G
S
M

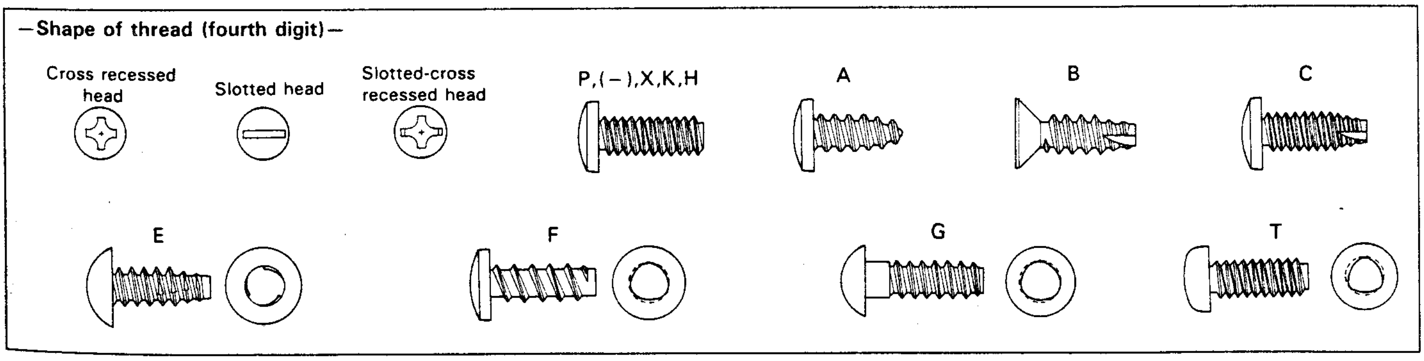

—Shape of screw head (second digit)—
B
D
H
P
R
S
T
W
X
Length

Material (third digit)

S	Steel
E	Stainless steel
C	Cast iron
U	Copper
B	Brass
P	Phosphor bronze
N	Nickel silver
Y	Cast brass
A	Aluminum
Z	Zinc alloy
K	Polycarbonate

Shape of thread (fourth digit)

P	Cross recessed head screws
(−)	Slotted head machine screws
X	Slotted-cross recessed head machine screws
K	Cross recessed head machine screws for precision equipment (type 1)
H	″ (type 3)
A	Cross recessed head tapping screws (type 1)
B	″ (type 2)
C	″ (type 3)
E	Cross recessed head special tapping screws (brand : evertight)
F	″ (brand : P-tight)
T	″ (brand : taptight)
G	″


—Shape of thread (fourth digit)—
Cross recessed head
Slotted head
Slotted-cross recessed head
P,(−),X,K,H
A
B
C
E
F
G
T

Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

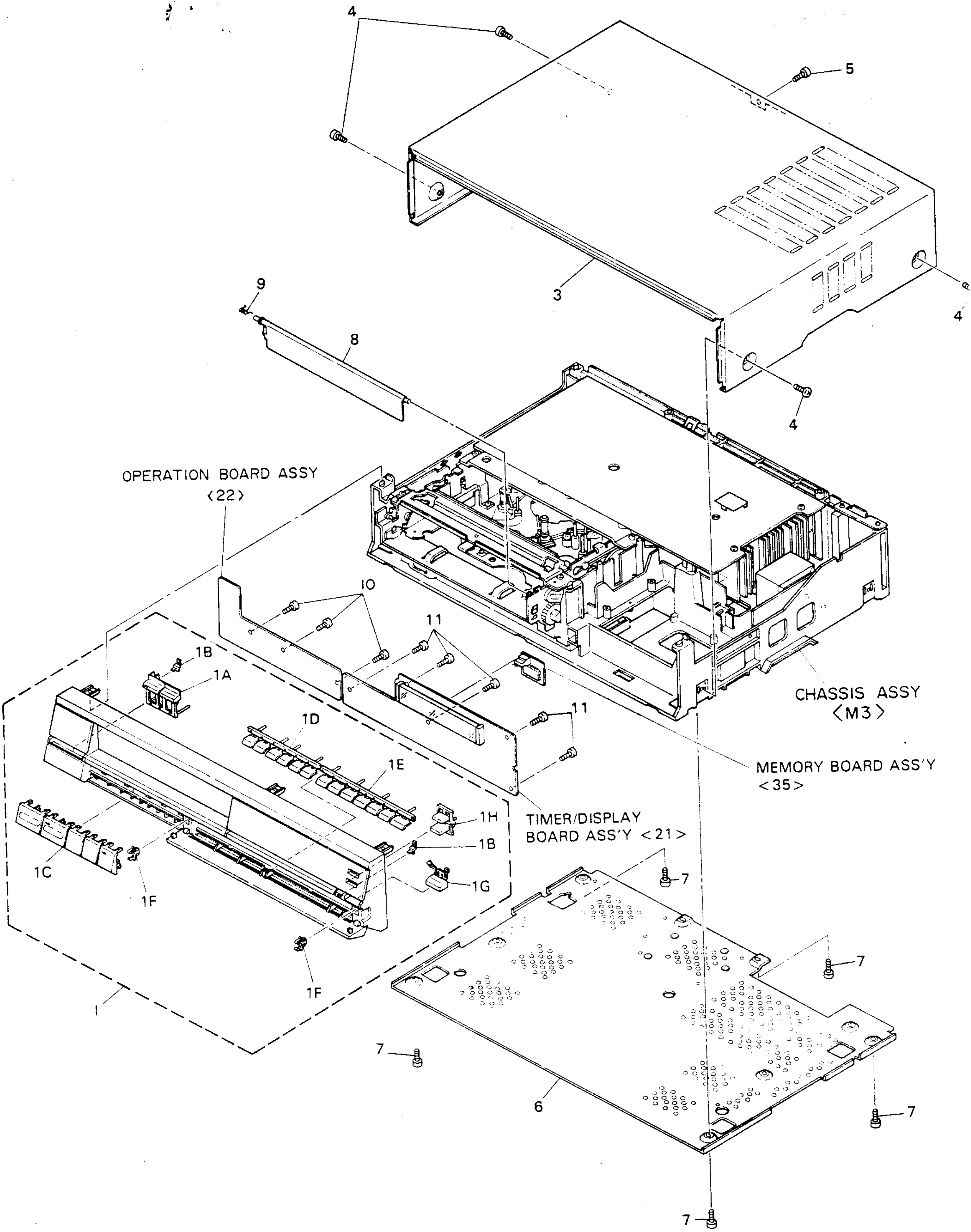
Length (seventh and eighth digits)

The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

Z	Dichromate treatment after galvanizing (MFZn II-C)
N	Nickel plating (MFNiII, MFNiI)
R	Chromium plating (MBCrII, MBCrI)
G	Silver plating (SP4)
B	Black coating after plating
F	Blackening of iron (FB)
M	Blackening after galvanizing
K	Pickling of brass (PF2)
P	Phosphate treatment
W	Uni-chrome plating
L	Coated with transparent paint
A	Colored red after galvanizing (MFZnII-C)
C	Colored blue after galvanizing (MFZzII-C)
T	Colored green after galvanizing (MFZnII-C)
V	Colored purple after galvanizing (MFZnII-C)

4.2 CABINET ASSEMBLY <M2>


4
5
3
4
4
4
9
8
OPERATION BOARD ASSY
<22>
10
11
1B
1A
1D
1E
11
1H
1B
1G
1C
1F
1F
1
CHASSIS ASSY
<M3>
MEMORY BOARD ASS'Y
<35>
TIMER/DISPLAY
BOARD ASS'Y <21>
7
7
7
6
7
7

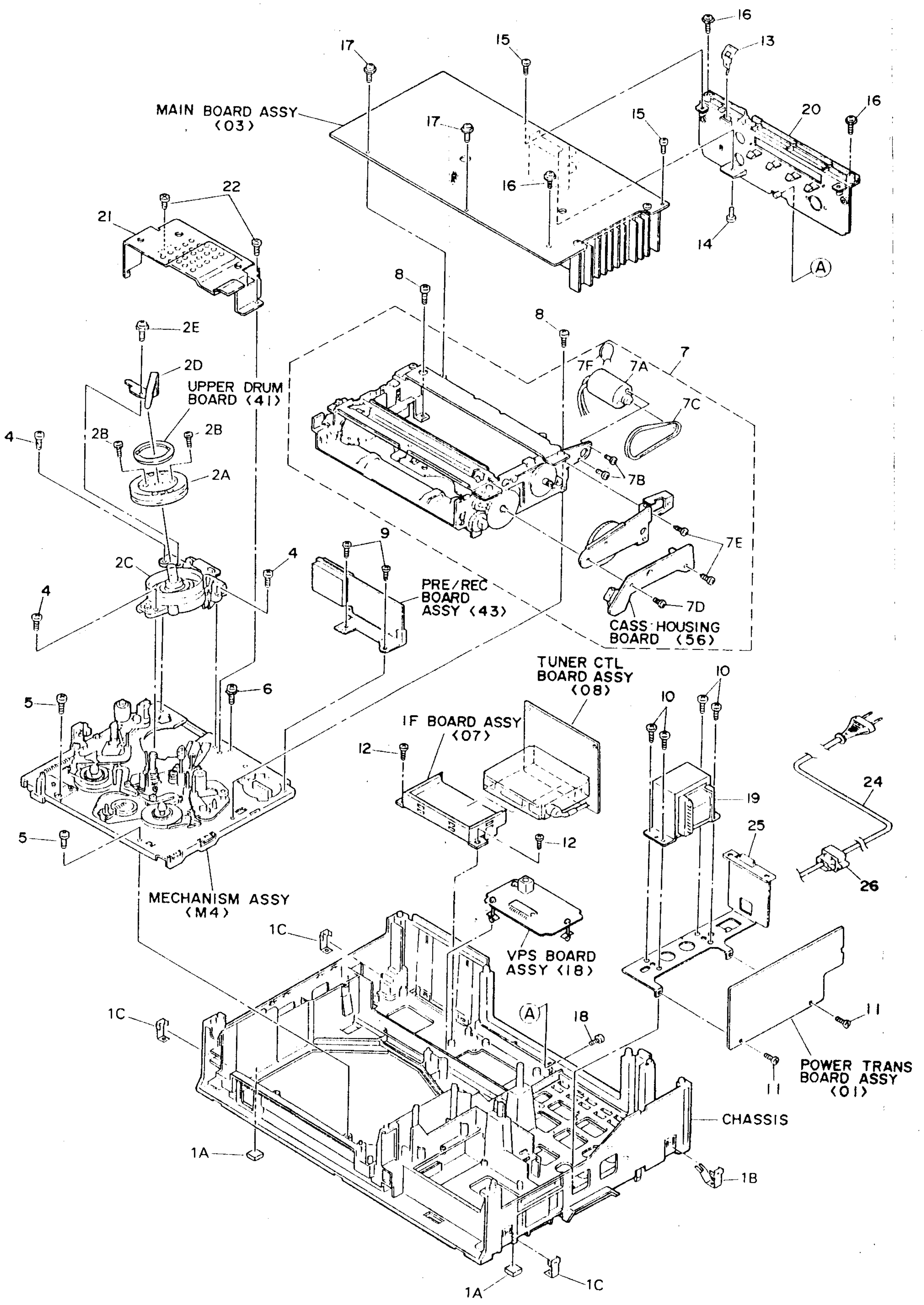
CABINET ASSEMBLY <M2>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ10492D-6	FRONT PANEL AY, FOR HR-D320EG
		PQ10492F-6	FRONT PANEL ASSY, FOR HR-D320E
	1A	PQ31739-4	BUTTON (POWER)
		PQ31739-5	BUTTON (POWER)
	1B	PQ43050-1-2	INDICATOR (1), X2
	1C	PQ20622	BUTTON (OPERATION)
		PQ20622-2	BUTTON (OPERATION)
	1D	PQ31742-7	BUTTON (PROGRAM-1)
		PQ31742-5	BUTTON (PROGRAM-1)
	1E	PQ31743-5	BUTTON (PROGRAM-2)
		PQ31743-4	BUTTON (PROGRAM-2)
	1F	PU60109	CATCHER, X2
	1G	PQ31741-4	BUTTON (REC)
	1H	PQ31747-1-2	BUTTON (CHANNEL)
⚠	3	PQ10473-2-5	TOP COVER
	4	SDSA4014M	TAPPING SCREW, X4
	5	SDSF3010M	TAPPING SCREW
⚠	6	PQ10472-1-2	BOTTOM COVER
	7	SDSF3008Z	TAPPING SCREW, X5
	8	PQ31819-6-4	C.HOUSING DOOR
	9	PQ42410-1-1	TORSION SPRING
	10	SDSF2608Z	TAPPING SCREW, X3
	11	SDSF2608Z	TAPPING SCREW, X5

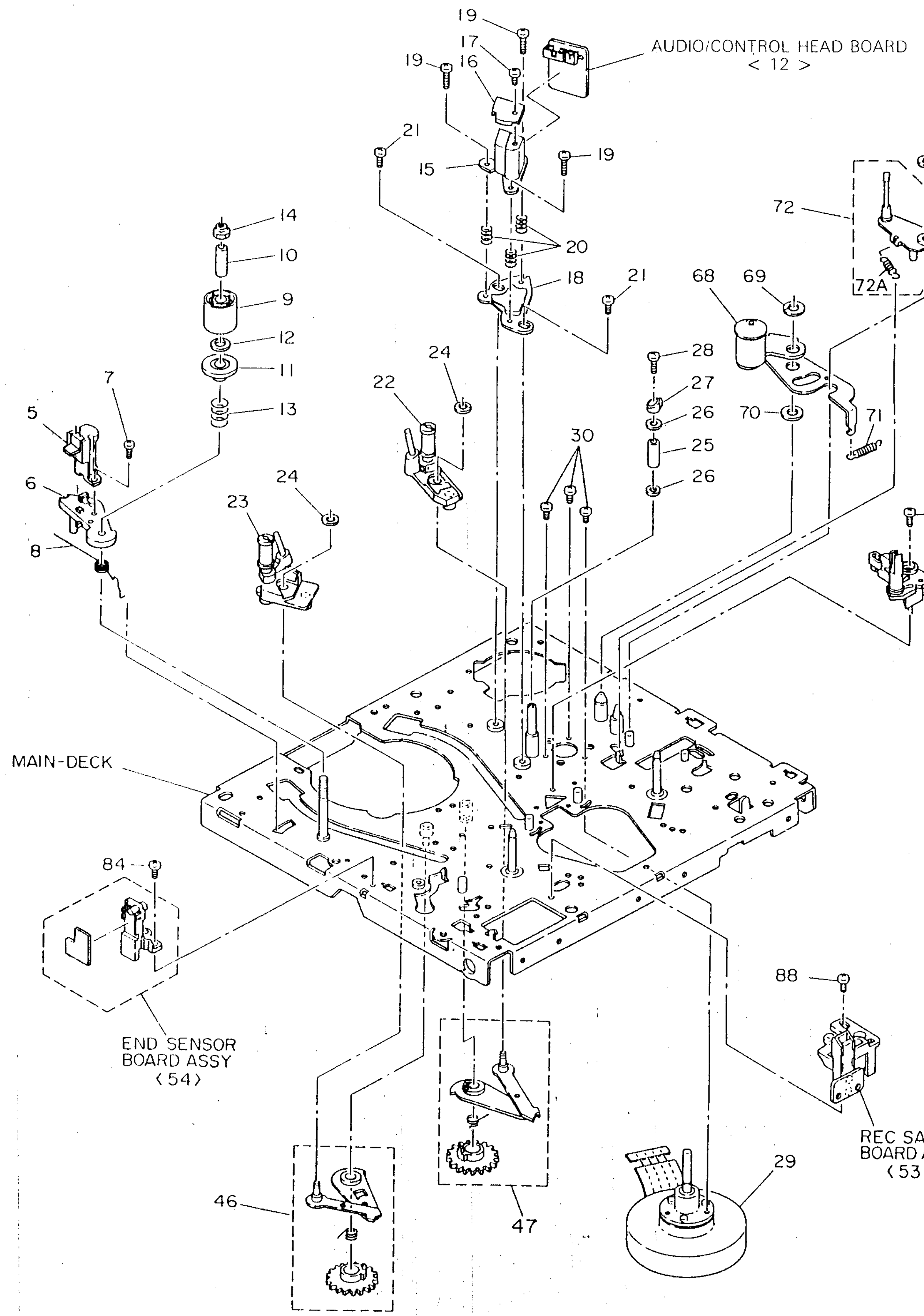
CHASSIS ASSEMBLY <M3>

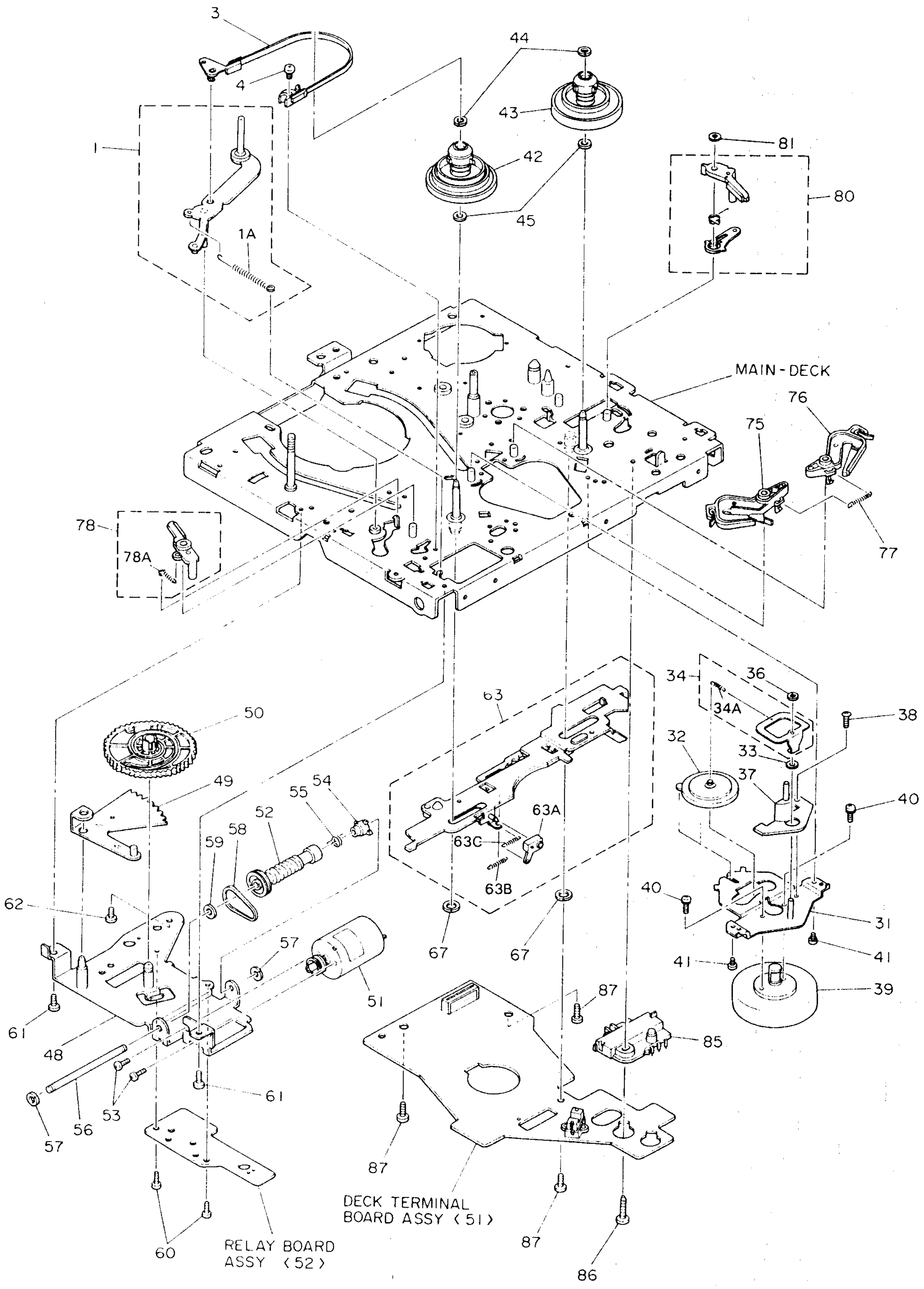
#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	1A	PQ43013	FOOT, X2
	1B	PQ43023	EARTH PLATE
	1C	PQ43011	EARTH PLATE, X3
	2A	PDM2008B-5	UPPER DRUM ASSY
	2B	PDM4165A	DRUM SCREW ASSY, X2
	2C	PDM2101C-1	LOWER DRUM MOTOR ASSY
	2D	PDM4015B	BRUSH ASSY
	2E	LPSP2606Z	SCREW
	4	SDSP2608Z	SCREW, X3
	5	SDSA4014Z	TAPPING SCREW, X2
	6	PQ41396	SPECIAL SCREW
	7	PUS28277H	CASS.HOUSING ASSY
⚠	7A	PQ42385A	CASSETTE MOTOR ASSY
⚠	OR	PQ42385B	CASSETTE MOTOR ASSY
	7B	SPSP2603Z	SCREW, X2
	7C	PQM30003-19	BELT
	7D	SPSP2604Z	SCREW
	7E	SPST2605Z	TAPPING SCREW, X2
	7F	DV710SR223M16	VARISTOR
	8	SDST2605Z	TAPPING SCREW, X2
	9	SDST2605Z	TAPPING SCREW, X2
	10	SDSA4014Z	TAPPING SCREW, X4
	11	SDST3006Z	TAPPING SCREW, X2
	12	SDSF3008Z	TAPPING SCREW, X2
	13	PQ43012	EARTH PLATE
	14	SDST2605Z	TAPPING SCREW
	15	SDSA2608Z	TAPPING SCREW, X2
	16	GPSF2610Z	TAPPING SCREW, X3
	17	GPST2608Z	SCREW, X2
	18	SDSF3010M	TAPPING SCREW
⚠	19	PU60178	POWER TRANSFORMER
⚠	20	PQ20438-1-2	TERMINAL BOARD
⚠		PQ20438-3-2	TERMINAL BOARD
	21	PQ31171-2-7	DRUM SHIELD
	22	SDST2605Z	TAPPING SCREW, X2
⚠	24	QMP3980-200	POWER CORD
⚠	25	PQ31670	TRANS BRACKET
⚠	26	QHS3771-108	STRAIN RELIEF

4.3 CHASSIS ASSEMBLY <M3>


16
13
17
15
MAIN BOARD ASSY (03)
17
15
20
16
16
14
Ⓐ
22
21
8
2E
2D
UPPER DRUM BOARD (41)
8
7F
7A
7
7C
4
2B
2B
2A
7B
7B
7E
9
4
2C
PRE/REC BOARD ASSY (43)
4
7D
CASS HOUSING BOARD (56)
TUNER CTL BOARD ASSY (08)
10
10
5
6
IF BOARD ASSY (07)
12
19
24
12
25
5
26
MECHANISM ASSY (M4)
1C
VPS BOARD ASSY (18)
1C
Ⓐ
18
11
11
POWER TRANS BOARD ASSY (01)
CHASSIS
1A
1B
1A
1C

4.4 MECHANISM ASSEMBLY <M4>

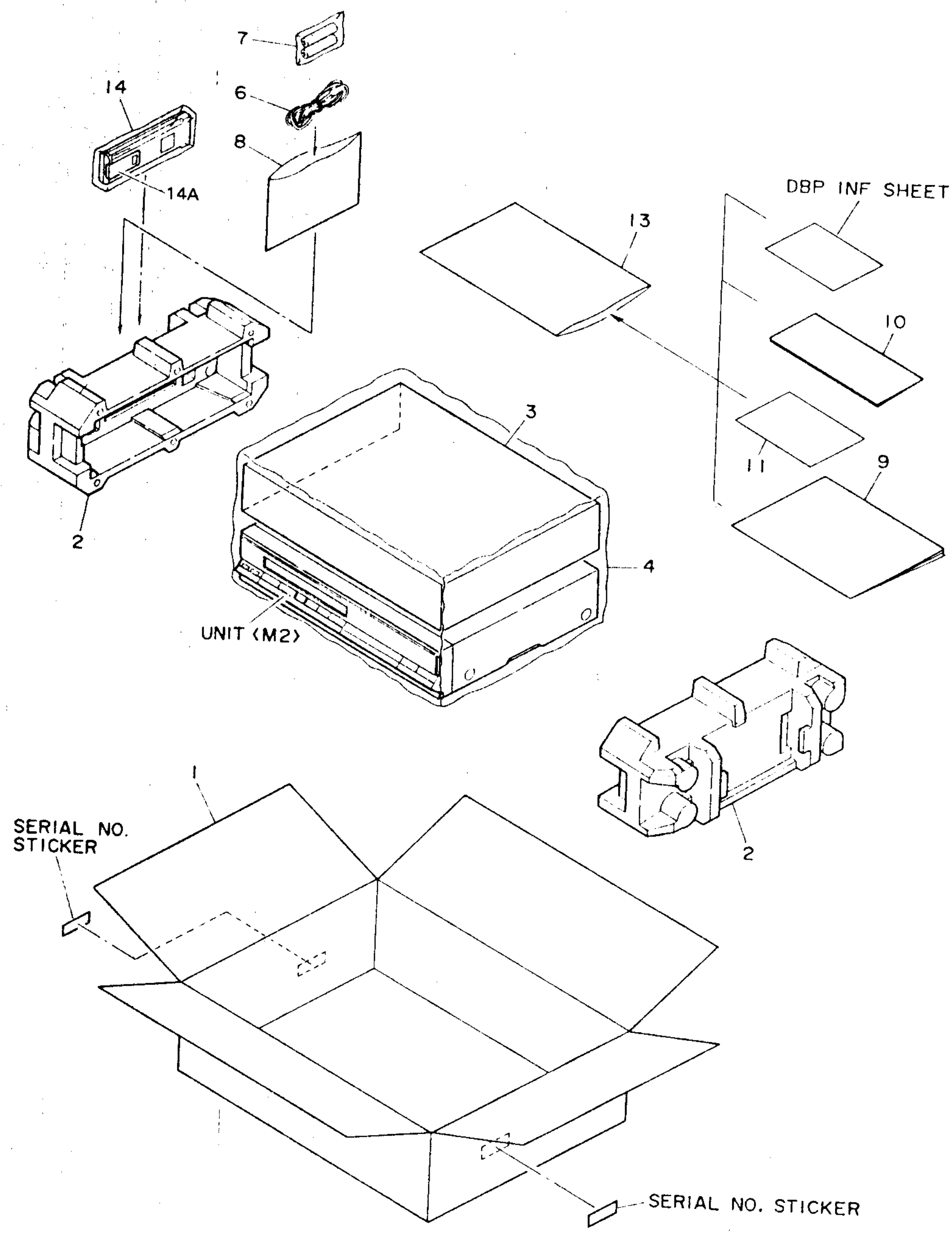

19
17
16
19
AUDIO/CONTROL HEAD BOARD
< 12 >
21
15
19
14
10
9
12
11
13
7
5
6
8
20
18
21
24
22
23
24
30
28
27
26
25
26
68
69
70
71
72
72A
74
83
82
MAIN-DECK
84
END SENSOR
BOARD ASSY
< 54 >
88
REC SAFETY
BOARD ASSY
< 53 >
29
46
47


3
4
44
43
42
45
1
1A
81
80
MAIN-DECK
76
75
77
78
78A
63
50
49
52
55
54
63A
63C
63B
34
36
34A
38
32
33
37
40
40
31
41
41
39
59
58
62
57
51
67
67
61
48
53
61
56
57
87
85
87
DECK TERMINAL
BOARD ASSY < 51 >
87
86
60
RELAY BOARD
ASSY < 52 >

MECHANISM ASSEMBLY <M4>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ41944A-7	TENSION ARM ASSY
	1A	PQ41952-3	SPRING
	3	PQ41948A	TENSION BAND ASSY
	4	SDST2606Z	TAPPING SCREW
	5	PU57641-2	FULL ERASE HEAD
	6	PQ31036	FULL ERASE HEAD BASE
	7	SPSG2606Z	SCREW
	8	PQ41954-1-1	TORSION SPRING
	9	PQ41955	IMPEDANCE ROLLER
	10	PQ41956	COLLAR
	11	PQ41957	LOWER FLANGE
		OR PQ42958	LOWER FLANGE
	12	PQM30018-39	SPACER
		OR PQM30018-50	SPACER
	13	PQM30002-124	COMPRESSION SPRING
	14	PQ40353	NYLON NUT
	15	PU59253	AUDIO/CONTROL HEAD
	16	PU55535	SHIELD CAP
	17	HPSP2015N	SCREW
	18	PQ42984-2	HEAD BASE
	19	SPSP2608Z	SCREW, X3
	20	PU30080-49	SPRING, X3
	21	SDSP2606Z	SCREW,X2
	22	PQ41963A-2	POLE BASE ASSY(TAKE-UP)
		OR PU59994	POLE BASE ASSY(TAKE-UP)
	23	PQ41969A-2	POLE BASE ASSY(SUPPLY)
		OR PU59993	POLE BASE ASSY(SUPPLY)
	24	PQM30017-5	SLIT WASHER, X2
	25	PU53629-2	TAPE GUIDE
	26	PQ40268-2	GUIDE FLANGE, X2
	27	PQ42999-2-1	G.POLE CAP
	28	SDSP2006Z	SCREW
⚠	29	PU58635V	CAPSTAN MOTOR
	30	SPSP2605N	SCREW, X3
	31	PQ41974A-3	REEL MOTOR BRACKET ASSY
	32	PU58645-1-4	IDLER ARM
	33	Q03093-834	WASHER
	34	PQ41976A-1	SPRING ARM ASSY
	34A	PQ42212-1-4	SPRING
	36	PQM30017-22	SLIT WASHER
	37	PQ41978	HOLDER
	38	SPST2606Z	TAPPING SCREW
⚠	39	PU58636W	REEL MOTOR
⚠		OR PU58636M	REEL MOTOR
	40	LPSP2604Z	SCREW, X2
	41	SPST2606Z	TAPPING SCREW, X2
	42	PU59250-1-2	REEL DISK (SUPPLY)
	43	PU58638-1-2	REEL DISK (TAKE-UP)
	44	PQM30017-5	SLIT WASHER, X2
	45	Q03093-828	WASHER, X2
	46	PQ41979A-5	LOADING ARM ASSY (SUPLLY)
	47	PQ41985B-3	LOADING ARM AY (TAKE-UP)
	48	PQ41992A-2	CAM BRACKET SUB ASSY
	49	PQ41994A-3	ARM GEAR SUB ASSEMBLY
	50	PQ20250-1-1	CONTROL CAM
⚠	51	PQ41996A	MODE MOTOR ASSY
	52	PQ41998A	WORM GEAR ASSY
	53	LPSP2604Z	SCREW, X2
	54	PQ42001	WINDMILL
	55	PQ42002	CLUTCH SPRING
	56	PQ42003	WORM SHAFT
	57	PQM30017-5	SLIT WASHER, X2
	58	PQM30003-20	BELT
	59	PQM30018-22	SPACER
	60	SPST2606Z	SCREW, X2
	61	SPST2606Z	SCREW, X2
	62	SPSP2603Z	SCREW
	63	PQ42038A-3	PLATE ASSY
	63A	PQ31044-1-2	LOCK LEVER
	63B	PQM30001-191	TENSION SPRING
	63C	PQM30001-211	TENSION SPRING
	67	PQM30017-28	SLIT WASHER, X2
	68	PQ42006B	PINCH ROLLER ARM ASSY
	69	PQM30017-28	SLIT WASHER
	70	Q03093-833	WASHER
	71	PQM30001-229	TENSION SPRING
	72	PQ42013B-4	GUIDE ARM ASSY
	72A	PQ42029	SPRING
	74	PQM30017-6	SLIT WASHER
	75	PQ42019A-6	MAIN BRAKE ASSY (SUPPLY)
	76	PQ42020B	MAIN BRAKE ASSY (TAKE-UP)
	77	PQM30001-216	TENSION SPRING
	78	PQ42021A-3	SUB BRAKE ASSY (SUPPLY)
	78A	PQ42023-1-2	TENSION SPRING
	80	PQ42037A-2	SUB BRAKE ASSY (TAKE-UP)
	81	PQM30017-6	SLIT WASHER
	82	PU59925-1-1	LED HOLDER (INCL.LED)
	83	SPST2606Z	TAPPING SCREW
	84	SPST2606Z	TAPPING SCREW
	85	PU58642	SLIDE ENCODER
	86	SDSP2610Z	SCREW
	87	SDSP2606Z	SCREW, X3
	88	SDST2606Z	TAPPING SCREW

4.5 PACKING ASSEMBLY <M1>


7
14
6
8
14A
DBP INF SHEET
13
10
3
11
9
2
4
UNIT (M2)
1
SERIAL NO. STICKER
2
SERIAL NO. STICKER

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			PACKING ASSEMBLY <M1>
	1	PQ31705-125	PACKING CASE, FOR HR-D320E
		PQ31705-122	PACKING CASE, FOR HR-D320EG
	2	PQ31995A-2	CUSHION ASSY
	3	PQ41026-12	PROTECT SHEET
	4	PQM30021-59-11	POLY BAG
⚠	6	PU59168-3	RF CABLE
⚠		OR PU59167-3	RF CABLE
	7	UM-3DJ2P	BATTERY (2 CELLS)
	8	QPGA020-02003	POLY BAG

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	9	PU30425-965	INSTRUCTIONS, FOR HR-D320EG
⚠		PU30425-968	INSTRUCTIONS, FOR HR-D320E
	10	TCN-3379	TAPE CATALOG
	11	BT-20069A	WARRANTY CARD, FOR HR-D320EG
	13	QPGA025-03505	POLY BAG
⚠	14	PQ10543AE-21	RMT CONTROLLER, FOR HR-D320E
⚠		PQ10543AC-21	RMT CONTROLLER, FOR HR-D320EG
	14A	PQ31449	BATTERY CAP

SECTION 5
ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS—All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μF, unless otherwise indicated.

pF	: μμF (Pico farad)
C Cap	: Ceramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

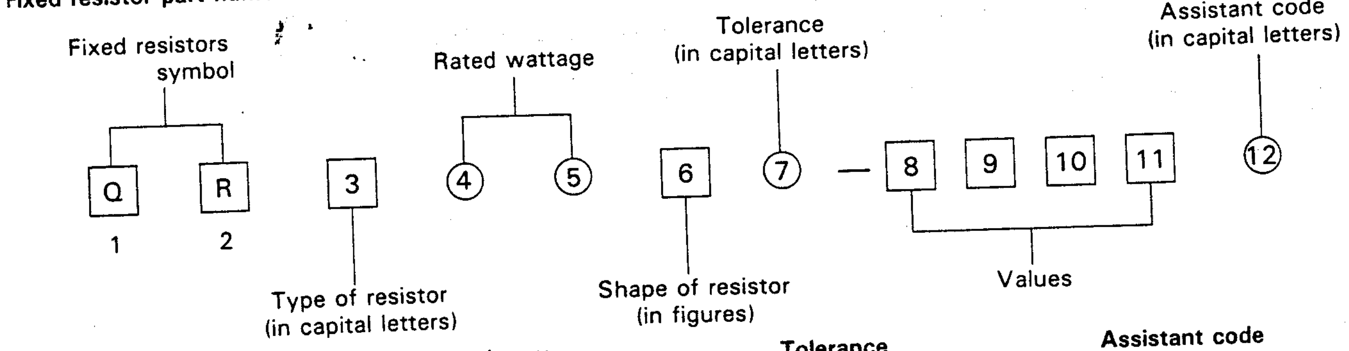
NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.


Fixed resistors symbol
Rated wattage
Tolerance (in capital letters)
Assistant code (in capital letters)
Q
R
1
2
3
4
5
6
7
8
9
10
11
12
Type of resistor (in capital letters)
Shape of resistor (in figures)
Values

Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead tapping
Z	Lead tapping

Values (eighth — tenth or eleventh digits)

examples:

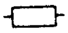
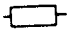
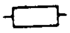
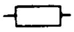
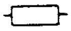
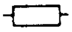
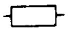
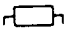
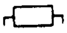
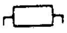
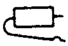
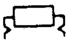
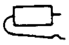
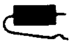
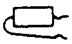
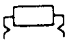
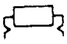
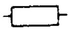
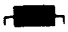
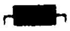
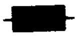
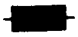
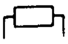
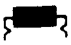
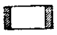
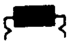
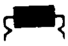
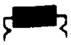
R47		0.47 Ω
4R7		4.7 Ω
470	47×10^0	47 Ω
471	47×10^1	470 Ω
472	47×10^2	4.7 kΩ
473	47×10^3	47 kΩ
474	47×10^4	470 kΩ
475	47×10^5	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^0	464 Ω
4641	464×10^1	4.64 kΩ
4642	464×10^2	46.4 kΩ

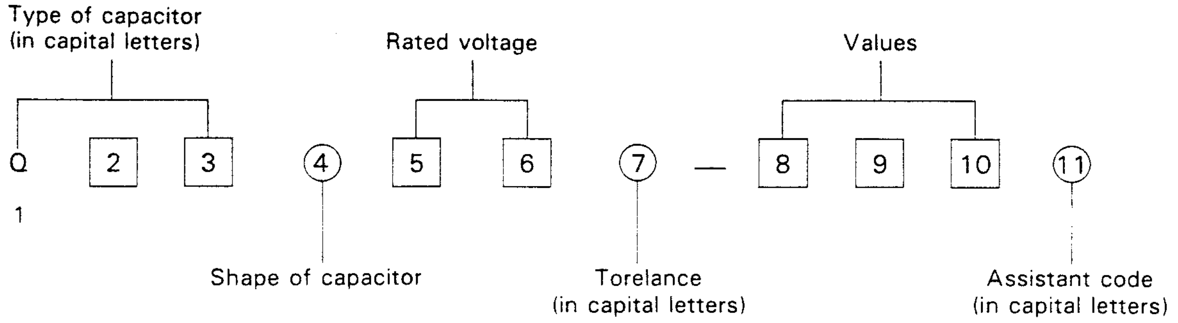
Shape of resistor. (sixth digit)

Note: ■ indicates flame retardant resistor.

Shape of resistor \ Type of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				 Chip			
9			Lug (C) type							

5.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.


Type of capacitor
(in capital letters)
Rated voltage
Values
Q
2
3
4
5
6
7
—
8
9
10
11
1
Shape of capacitor
Torelance
(in capital letters)
Assistant code
(in capital letters)

Ceramic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit / Fifth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	± 20 %
F	± 1 %	N	± 30 %
G	± 2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	± 5 %	X	$^{+40}_{-20}$ %
K	± 10 %	Z	$^{+80}_{-20}$ %

Values (eighth — tenth digits)

Example : Values are in picofarads

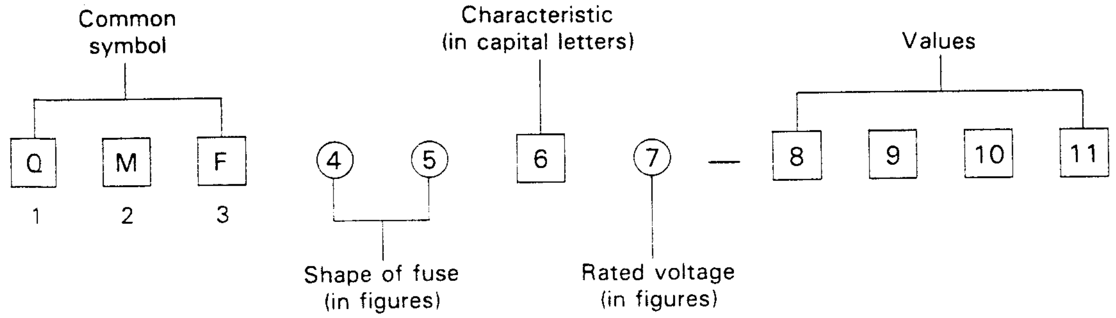
101 .... 10×10^1 pF .... 100 pF
102 .... 10×10^2 pF .... 1,000 pF (0.001 µF
103 .... 10×10^3 pF .... 10,000 pF (0.01 µF
104 .... 10×10^4 pF .... 100,000 pF (0.1 µF
105 .... 10×10^5 pF .... 1 µF
5R0 .... 5.0 pF

Assistant code (eleventh digit)

G	Small size
Z	Lead tapping
Y	Lead tapping

5.1.3 Fuse coding

Standard fuse part numbers are as follows.


Common symbol
Characteristic (in capital letters)
Values
Q
M
F
1
2
3
4
5
6
7
—
8
9
10
11
Shape of fuse (in figures)
Rated voltage (in figures)

Shape of fuse
(fourth and fifth digits)

51	φ5.2×20 mm
60	φ6.4×30 mm
61	φ6.35×31.8 mm
63	φ6.4×30 mm with lead wires
66	φ6.35×31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1–1 A : AC250 V 1.25–6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:
R63 .... 0.63 A
1R0 .... 1.0 A
2R5 .... 2.5 A
100 .... 10 A
R315 .... 0.315 A
1R25 .... 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

POWER TRANSFORMER BOARD ASSEMBLY <01>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB20005A-01	POWER TRANS BOARD ASSY
	Q1	2SA720	TRANSISTOR
	D1	11E2	DIODE
		OR 1SR35-200A	DIODE
		OR 11ES2	DIODE
		OR ERA15-02	DIODE
		OR S5688G	DIODE
	D2	11E2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR 11ES2	DIODE
		OR ERA15-02	DIODE
	D3	11E2	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
	D4	11E2	DIODE
		OR 11ES2	DIODE
		OR ERA15-02	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
	D5	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D6	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D7	11E2	DIODE
		OR 1SR35-200A	DIODE
		OR ERA15-02	DIODE
		OR S5688G	DIODE
		OR 11ES2	DIODE
	D8	11E2	DIODE
		OR ERA15-02	DIODE
		OR 11ES2	DIODE
		OR S5688G	DIODE
		OR 1SR35-200A	DIODE
	D9	11E2	DIODE
		OR S5688G	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR ERA15-02	DIODE
	D10	11E2	DIODE
		OR 1SR35-200A	DIODE
		OR 11ES2	DIODE
		OR ERA15-02	DIODE
		OR S5688G	DIODE
	D11	11E2	DIODE
		OR 11ES2	DIODE
		OR ERA15-02	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
	D12	HZ30-2	ZENER DIODE
	DS1	S4VB10-F2	BRIDGE DIODE
⚠	R1	QRZ0052-100	FUSIBLE RESISTOR
	R2	QRD181J-224	RESISTOR
⚠	R3	QRD181J-222	RESISTOR
	R4	QRD181J-822	RESISTOR
⚠	R5	QRZ0052-221	FUSIBLE RESISTOR
	R6	QRD181J-121	RESISTOR
	C1	QETB1EM-228	E CAPACITOR
	C2	QETB1EM-228	E CAPACITOR
	C3	QETB1CM-478	E CAPACITOR
	C4	QETB1JM-107	E CAPACITOR
	C5	QETB1JM-107	E CAPACITOR
	C6	QETC1VM-106	E CAPACITOR
	C7	QETC1HM-226	E CAPACITOR
	C9	QFK52AK-473	M CAPACITOR
⚠	C101	QCZ9016-472P	CAPACITOR
⚠	HD1	PU57505	FUSE CLIP, X6,FOR F1,F2,F3
⚠	LF1	PU60088	LINE FILTER
⚠	LF2	PU60089	LINE FILTER
⚠	TAB1	A74316	TAB, X2
	CN1	PU59555-6	CAP HOUSING
	CN2	PU59555-6	CAP HOUSING
⚠	F1	QMF51E2-R63	FUSE, NOT INCLUDED
⚠	F2	QMF51E2-2R0	FUSE, NOT INCLUDED
⚠	F3	QMF51E2-R80	FUSE, NOT INCLUDED

MAIN BOARD ASSEMBLY <03>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB10002L	MAIN BOARD ASSY,FOR HR-D320EG.
		PB10002M	MAIN BOARD ASSY,FOR HR-D320E
⚠	RF1	PU59980M-4	RF CONVERTER/MIX BOOSTER
	RV1	PU52105	PLASTIC RIVET, X2
	TB1	PU60192G	CONNECTOR BOARD

-AUDIO SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	IC1	BA7751ALS	IC
	Q1	2SC1740S(RS)	TRANSISTOR
	Q3	2SC1740S(RS)	TRANSISTOR
	Q5	2SC1740S(RS)	TRANSISTOR
	Q6	DTA124ES	TRANSISTOR
	Q7	DTA114ES	TRANSISTOR
	Q8	2SC1740S(RS)	TRANSISTOR
	Q9	2SC1740S(RS)	TRANSISTOR
	Q10	2SC1740S(RS)	TRANSISTOR
	Q11	DTA114ES	TRANSISTOR
	Q12	DTA114ES	TRANSISTOR
	Q13	2SD1450S,T	TRANSISTOR
	Q14	DTC124ES	TRANSISTOR
	D1	1SS133	DIODE
		OR MA165	DIODE
	D2	1SS133	DIODE
		OR MA165	DIODE
	R2	QRD161J-152	RESISTOR
	R3	QRD161J-222	RESISTOR
	R6	QRD161J-471	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R7	QRD161J-103	RESISTOR
	R8	QRD161J-152	RESISTOR
	R9	QRD161J-222	RESISTOR
	R13	QRD161J-223	RESISTOR
	R14	QRD161J-102	RESISTOR
	R15	QRD161J-223	RESISTOR
	R16	QRD161J-102	RESISTOR
	R17	QRD161J-102	RESISTOR
	R20	QRD161J-103	RESISTOR
	R21	QRD161J-333	RESISTOR
	R22	QRD161J-102	RESISTOR
	R23	QRD161J-223	RESISTOR
	R25	QRD161J-223	RESISTOR
	R26	QRD161J-100	RESISTOR
	R27	QRD161J-470	RESISTOR
	R28	QRD161J-393	RESISTOR
	R29	QRD161J-221	RESISTOR
	R30	QRD161J-224	RESISTOR
	R31	QRD161J-123	RESISTOR
	R33	QVZ3518-103	V RESISTOR
	R34	QRD161J-103	RESISTOR
	R35	QRD161J-122	RESISTOR
	R36	QRD161J-472	RESISTOR
	R37	QRD161J-393	RESISTOR
	R38	QRD161J-183	RESISTOR
	R39	QRD161J-821	RESISTOR
	R40	QRD161J-121	RESISTOR
	R41	QVZ3518-473	V RESISTOR
	R42	QRD161J-333	RESISTOR
	R43	QRD161J-150	RESISTOR
	R44	QRD161J-104	RESISTOR
	R45	QRD161J-8R2	RESISTOR
	R46	QRD161J-473	RESISTOR
	R47	QRD161J-473	RESISTOR
	R49	QRD161J-0R0	RESISTOR
	C1	QETB1CM-336	E CAPACITOR
	C2	QETC1HM-105	E CAPACITOR
	C3	QCC11EJ-682	CAPACITOR
	C4	QETC1CM-336	E CAPACITOR
	C5	QETC1EM-475	E CAPACITOR
	C7	QCBB1HJ-102	CAPACITOR
	C8	QEB51HM-105	E CAPACITOR
	C9	QETC1CM-106	E CAPACITOR
	C10	QCC11EJ-103	CAPACITOR
	C11	QETC1HM-105	E CAPACITOR
	C12	QETC1HM-105	E CAPACITOR
	C13	QETC1CM-226	E CAPACITOR
	C14	QETC1HM-225	E CAPACITOR
	C15	QETC1HM-105	E CAPACITOR
	C16	QETC1CM-106	E CAPACITOR
	C18	QFV71HJ-273	M CAPACITOR
	C19	QCBB1HJ-331	CAPACITOR
	C20	QFV71HJ-683	M CAPACITOR
	C21	QETC1CM-106	E CAPACITOR
	C22	QCC11EJ-472	CAPACITOR
	C23	QCC11EJ-103	CAPACITOR
	C24	QCC11EK-272	CAPACITOR
	C25	QETC1CM-106	E CAPACITOR
	C26	QETC1CM-336	E CAPACITOR
	C27	QCVB1CN-103	CAPACITOR
	C28	QCBB1HJ-102	CAPACITOR
	C30	QCBB1HJ-102	CAPACITOR
	L1	PU58308-682J	COIL
	L3	PU60281-4	FERRITE BEADS
	LC1	PU60281-3	FERRITE BEADS
	LC2	PU60281-3	FERRITE BEADS
⚠	T1	PU60017-2	OSC TRANSFORMER
	TP31	PU57545	TEST PIN, X3(31-33)
		-LUMINANCE SECTION-	
	IC101	PB20166C	Y MODULE BOARD ASSY
⚠	IC102	MSM6967RS	IC
	Q101	2SC1740S(RS)	TRANSISTOR
	Q102	2SC1740S(RS)	TRANSISTOR
	Q103	2SA1309R,S	TRANSISTOR
	Q104	2SC1740S(RS)	TRANSISTOR
	Q105	2SC1740S(RS)	TRANSISTOR
	Q106	2SA1309R,S	TRANSISTOR
	Q107	2SA1309R,S	TRANSISTOR
	Q110	DTC144WS	TRANSISTOR
	Q111	DTC124ES	TRANSISTOR
	Q113	DTC114YS	TRANSISTOR
	Q114	DTC144ES	TRANSISTOR
	D101	1SS133	DIODE
		OR MA165	DIODE
	D102	1SS133	DIODE
		OR MA165	DIODE
	D103	1SS133	DIODE
		OR MA165	DIODE
	D104	RD9.1ESB2	ZENER DIODE
	D105	1SS133	DIODE
		OR MA165	DIODE
	D106	1SS133	DIODE
		OR MA165	DIODE
	D109	1SS133	DIODE
		OR MA165	DIODE
	D110	1SS133	DIODE
		OR MA165	DIODE
	D111	MA27W(A)	DIODE
	D112	1SS133	DIODE
		OR MA165	DIODE
	D113	1SS292	DIODE
	R101	QRD161J-103	RESISTOR
	R102	QRD161J-102	RESISTOR
	R103	QRD161J-333	RESISTOR
	R104	QRD161J-333	RESISTOR
	R105	QRD161J-102	RESISTOR
	R108	QRD161J-391	RESISTOR
	R109	QRD161J-561	RESISTOR
	R110	QRD161J-333	RESISTOR
	R111	QRD161J-102	RESISTOR
	R112	QVZ3518-222	V RESISTOR, N.C.BALANCE
	R113	QRD161J-222	RESISTOR
	R114	QRD161J-102	RESISTOR
	R115	QRD161J-181	RESISTOR
	R116	QRD161J-750	RESISTOR
	R117	QRD161J-102	RESISTOR
	R119	QRD121J-391	RESISTOR
	R120	QRD161J-333	RESISTOR
	R121	QRD161J-102	RESISTOR
	R122	QRD161J-333	RESISTOR
	R123	QRD161J-561	RESISTOR
	R124	QRD161J-101	RESISTOR
	R127	QVZ3518-332	V RESISTOR, PB FREQ
	R128	QRD161J-102	RESISTOR
	R129	QRD161J-102	RESISTOR
	R130	QRD161J-222	RESISTOR
	R133	QRD161J-563	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R134	QRD161J-750	RESISTOR
	R138	QRD161J-104	RESISTOR
	R139	QRD161J-124	RESISTOR
	R141	QRD161J-122	RESISTOR
	R142	QRD161J-681	RESISTOR
	R143	QRD161J-331	RESISTOR
	R144	QRD161J-472	RESISTOR
	R147	QRD161J-562	RESISTOR
	R148	QRD161J-223	RESISTOR
	R149	QRD161J-103	RESISTOR
	R150	QRD161J-222	RESISTOR
	R152	QRD161J-101	RESISTOR
	R153	QRD161J-682	RESISTOR
	R154	QRD161J-222	RESISTOR
	R155	QRD161J-681	RESISTOR
	R160	QRD161J-221	RESISTOR
	R161	QRD161J-153	RESISTOR
	R162	QRD161J-221	RESISTOR
	R163	QRD161J-222	RESISTOR
	R164	QRD161J-394	RESISTOR
	R165	QRD161J-103	RESISTOR
	C101	QCSB1HJ-220	CAPACITOR
	C102	QETC1AM-226	E CAPACITOR
	C103	QETC1HM-335	E CAPACITOR
	C104	QCVB1CN-103	CAPACITOR
	C105	QCBB1HJ-121	CAPACITOR
	C106	QCBB1HJ-121	CAPACITOR
	C108	QEN61HM-225	NP E CAPACITOR
	C109	QETC1EM-475	E CAPACITOR
	C110	QCSB1HJ-120	CAPACITOR
	C111	QETC1HM-104	E CAPACITOR
	C112	QETC1EM-475	E CAPACITOR
	C113	QCVB1CN-103	CAPACITOR
	C114	QCVB1CN-103	CAPACITOR
	C115	QCVB1CN-103	CAPACITOR
	C116	QETC0JM-476	E CAPACITOR
	C117	QETC1AM-476	E CAPACITOR
	C118	QCVB1CN-103	CAPACITOR
	C120	QCVB1CN-103	CAPACITOR
	C121	QETC1CM-106	E CAPACITOR
	C122	QETC1HM-224	E CAPACITOR
	C123	QETC1EM-335	E CAPACITOR
	C124	QETC0JM-337	E CAPACITOR
	C125	QEN61EM-335	NP E CAPACITOR
	C126	QCVB1CN-103	CAPACITOR
	C127	QCVB1CN-103	CAPACITOR
	C128	QCSB1HJ-470	CAPACITOR
	C129	QETC0JM-476	E CAPACITOR
	C130	QCVB1CN-103	CAPACITOR
	C131	QETC0JM-477	E CAPACITOR
	C132	QETC0JM-476	E CAPACITOR
	C133	QCVB1CN-103	CAPACITOR
	C134	QETC1CM-476	E CAPACITOR
	C135	QCBB1HJ-102	CAPACITOR
	C136	QCBB1HJ-102	CAPACITOR
	C137	QETC1EM-475	E CAPACITOR
	C138	QCSB1HK-6R8	CAPACITOR
	C139	QETC0JM-476	E CAPACITOR
	C140	QCVB1CN-103	CAPACITOR
	C141	QCVB1CN-103	CAPACITOR
	C142	QCVB1CN-103	CAPACITOR
	C143	QCF11HP-103	CAPACITOR
	C145	QCSB1HJ-120	CAPACITOR
	C146	QCBB1HJ-151	CAPACITOR
	C147	QCC11EK-104	CAPACITOR
	C148	QCVB1CN-103	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C149	QEN61AM-226	NP E CAPACITOR
	C150	QETC1EM-475	E CAPACITOR
	C152	QCSB1HJ-120	CAPACITOR
	C153	QCBC1HJ-102	CAPACITOR
	C154	QCBC1HJ-102	CAPACITOR
	C155	QCBB1HJ-102	CAPACITOR
	C156	QEN40JM-336	NP E CAPACITOR
	L101	PU59152-121J	PEAKING COIL
	L102	PU59152-221J	PEAKING COIL
	L103	PU59152-560J	PEAKING COIL
	L105	PU59152-101J	PEAKING COIL
	L106	PU48530-101K	PEAKING COIL
	L107	PU48530-101K	PEAKING COIL
	L108	PU59152-680J	PEAKING COIL
	L109	PU48530-101K	PEAKING COIL
	L110	PU59152-180J	PEAKING COIL
	L111	PU48530-101K	PEAKING COIL
	L112	PU48530-101K	PEAKING COIL
	L113	PU48530-101K	PEAKING COIL
	L114	PU59152-101J	PEAKING COIL
	L118	PU53618-R47D	PEAKING COIL
		OR PU59152-R47K	INDUCTOR
	EQ101	PU60162	EQUALIZER
	EQ102	PU54838	EQUALIZER
	LPF101	PU60161	LOW PASS FILTER
	LPF102	PU58021-2	LOW PASS FILTER
		OR PU58021-3	LOW PASS FILTER
	SLD101	PU60147	SHIELD CASE(1)
	SLD102	PU60148	SHIELD CASE(2)
	SLD103	PU60149	SHIELD CASE(3)
	TP106	PU57545	TEST PIN, X4(106/110/121/GND)
	CN104	PU58844-3	CAP HOUSING, E ONLY
	CN105	PU58844-4	CAP HOUSING, E ONLY

-VIDEO SUB BOARD SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA1	PB40016A	VIDEO SUB BOARD ASSY
	IC103	TA7374P	IC
	Q112	2SC2021R,S	TRANSISTOR
	R158	QRD162J-102	RESISTOR
	R159	QRD162J-332	RESISTOR
	L115	PU59152-3R3K	PEAKING COIL
	L116	PU59152-150J	PEAKING COIL
	L117	PU59152-120J	PEAKING COIL
	TML1	PU59935-09	TERMINAL

-COLOR SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	IC201	PU22046A	C.MODULE BOARD ASSY
	Q201	DTC144ES	TRANSISTOR
	Q202	DTC144ES	TRANSISTOR
	Q203	2SC1740S(RS)	TRANSISTOR
	Q204	2SC1740S(RS)	TRANSISTOR
	Q205	2SC1740S(RS)	TRANSISTOR
	Q206	DTC124ES	TRANSISTOR
	Q207	2SC1740S(RS)	TRANSISTOR
	Q209	DTC144ES	TRANSISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q210	DTC144ES	TRANSISTOR
	Q212	DTC144ES	TRANSISTOR
	Q213	2SC1740S(RS)	TRANSISTOR
	Q214	2SC1740S(RS)	TRANSISTOR
	Q252	2SC1740S(RS)	TRANSISTOR
	Q301	DTC144WS	TRANSISTOR
	Q302	2SA1309R,S	TRANSISTOR
	Q303	2SA1309R,S	TRANSISTOR
	Q304	DTC144WS	TRANSISTOR
	D201	1SS133	DIODE
		OR MA165	DIODE
	D202	1SS133	DIODE
		OR MA165	DIODE
	D203	1SS133	DIODE
		OR MA165	DIODE
	D204	1SS133	DIODE
		OR MA165	DIODE
	D205	1SS133	DIODE
		OR MA165	DIODE
	D206	1SS133	DIODE
		OR MA165	DIODE
	D207	1SS133	DIODE
		OR MA165	DIODE
	D208	1SS133	DIODE
		OR MA165	DIODE
	D251	1SS133	DIODE
	D252	1SS133	DIODE
	D253	1SS133	DIODE
	D254	1SS133	DIODE
	D255	1SS133	DIODE
	D256	1SS133	DIODE
	D257	1SS133	DIODE
	D301	1SS133	DIODE
		OR MA165	DIODE
	D302	1SS133	DIODE
	D303	1SS133	DIODE
	R201	QRD161J-222	RESISTOR
	R202	QRD161J-122	RESISTOR
	R203	QRD161J-103	RESISTOR
	R204	QRD161J-103	RESISTOR
	R205	QRD161J-682	RESISTOR
	R207	QVZ3518-223	V RESISTOR, VXO
	R208	QRD161J-274	RESISTOR
	R209	QRD161J-472	RESISTOR
	R210	QRD161J-102	RESISTOR
	R211	QRD161J-681	RESISTOR
	R214	QVZ3518-331	V RESISTOR, REC COLOR
	R215	QRD161J-153	RESISTOR
	R216	QRD161J-222	RESISTOR
	R217	QRD161J-102	RESISTOR
	R218	QRD161J-102	RESISTOR
	R219	QRD161J-103	RESISTOR
	R220	QRD161J-103	RESISTOR
	R221	QRD161J-272	RESISTOR
	R222	QRD161J-681	RESISTOR
	R223	QRD161J-473	RESISTOR
	R224	QRD161J-102	RESISTOR
	R225	QRD161J-102	RESISTOR
	R226	QRD161J-391	RESISTOR
	R227	QRD161J-221	RESISTOR
	R230	QRD161J-561	RESISTOR
	R231	QRD161J-271	RESISTOR
	R232	QRD162J-562	RESISTOR
	R233	QRD161J-104	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R234	QRD161J-682	RESISTOR
	R235	QRD161J-122	RESISTOR
	R236	QRD161J-393	RESISTOR
	R237	QRD161J-103	RESISTOR
	R238	QRD161J-103	RESISTOR
	R239	QRD161J-102	RESISTOR
	R240	QRD161J-471	RESISTOR
	R241	QRD161J-152	RESISTOR
	R242	QRD161J-223	RESISTOR
	R243	QRD161J-682	RESISTOR
	R244	QRD161J-102	RESISTOR
	R245	QRD161J-181	RESISTOR
	R246	QRD161J-391	RESISTOR
	R247	QRD161J-331	RESISTOR
	R248	QRD161J-122	RESISTOR
	R249	QRD161J-222	RESISTOR
	R262	QRD161J-393	RESISTOR
	R263	QRD161J-223	RESISTOR
	R264	QRD161J-333	RESISTOR
	R265	QRD161J-822	RESISTOR
	R301	QRD161J-103	RESISTOR
	R304	QRD161J-393	RESISTOR
	R305	QRD161J-682	RESISTOR
	R306	QRD161J-393	RESISTOR
	R307	QRD161J-682	RESISTOR
	R308	QRD161J-103	RESISTOR
	R309	QRD161J-562	RESISTOR
	C201	QETC1CM-106	E CAPACITOR
	C202	QCVB1CN-103	CAPACITOR
	C203	QFN31HJ-273	M CAPACITOR
	C204	QCT25CH-220	CAPACITOR
	C205	QFN31HJ-223	M CAPACITOR
	C206	QETC1HM-105	E CAPACITOR
	C207	QCVB1CN-103	CAPACITOR
	C208	QCSB1HJ-470	CAPACITOR
	C209	QFN31HJ-473	M CAPACITOR
	C210	QCBB1HJ-102	CAPACITOR
	C211	QCVB1CN-103	CAPACITOR
	C212	QCBB1HJ-820	CAPACITOR
	C213	QETC1HM-225	E CAPACITOR
	C214	QETC1CM-106	E CAPACITOR
	C215	QFN31HJ-563	M CAPACITOR
	C216	QFN31HJ-224	M CAPACITOR
	C217	QETC1CM-106	E CAPACITOR
	C218	QFN31HJ-103	M CAPACITOR
	C219	QFN31HJ-104	M CAPACITOR
	C220	QCVB1CN-103	CAPACITOR
	C221	QETC1EM-335	E CAPACITOR
	C222	QFN31HJ-563	M CAPACITOR
	C223	QCVB1CN-103	CAPACITOR
	C224	QETC1EM-475	E CAPACITOR
	C225	QETC0JM-107	E CAPACITOR
	C226	QCVB1CN-103	CAPACITOR
	C227	QCBB1HJ-101	CAPACITOR
	C229	QETC1HM-105	E CAPACITOR
	C230	QETC1EM-475	E CAPACITOR
	C231	QETC1EM-475	E CAPACITOR
	C232	QCVB1CN-103	CAPACITOR
	C233	QCBB1HJ-102	CAPACITOR
	C234	QETC0JM-476	E CAPACITOR
	C235	QCVB1CN-103	CAPACITOR
	C236	QCSB1HK-5R6	CAPACITOR
	C237	QCVB1CN-103	CAPACITOR
	C238	QCVB1CN-103	CAPACITOR
	C259	QCBB1HJ-102	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	L201	PU48530-101K	PEAKING COIL
	L202	PU48530-271J	PEAKING COIL
	L203	PU48530-222J	PEAKING COIL
	L204	PU59153-822J	PEAKING COIL
	L205	PU59153-101K	INDUCTOR
	L206	PU59152-150J	PEAKING COIL
	L207	PU48530-101J	PEAKING COIL
	L208	PU59152-820J	PEAKING COIL
	L301	PU48530-101K	PEAKING COIL
	EQ201	PU53501-7	EQUALIZER
	OR	PU53501-12	EQUALIZER
	LPF201	PU58705	LOW PASS FILTER
	OR	PU58705-2	LOW PASS FILTER
	LPF202	PU54988	LOW PASS FILTER
	OR	PU54988-2	LOW PASS FILTER
	BPF201	PU57072	BAND PASS FILTER
	BPF202	PU54410-2	BAND PASS FILTER
	DL201	PU60340	COMB FILTER
	OR	PU60222	2H DELAY LINE
	OR	PU58971-3	2H DELAY LINE
	OR	PU60490	COMB FILTER
⚠	XB201	PU58023	CRYSTAL BLOCK
⚠	OR	PU58126	CRYSTAL BLOCK
	X201	PU60307	CRYSTAL RESONATOR
	OR	PU59335	CRYSTAL RESONATOR
	OR	PU31449-4K	CRYSTAL RESONATOR
	TP205	PU57545	TEST PIN, X3(205/207/209)
	TP214	PU50766-2	TEST PIN

-SERVO SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	IC401	HD49722NT	IC
	D401	1SS133	DIODE
	OR	MA165	DIODE
	D404	1SS133	DIODE
	OR	MA165	DIODE
	D405	1SS133	DIODE
	OR	MA165	DIODE
	R401	QRD161J-102	RESISTOR
	R402	QRD161J-155	RESISTOR
	R403	QRD161J-103	RESISTOR
	R404	QRD161J-103	RESISTOR
	R405	QRD161J-105	RESISTOR
	R406	QRD161J-102	RESISTOR
	R409	QRD161J-475	RESISTOR
	R410	QRD161J-473	RESISTOR
	R411	QRD161J-333	RESISTOR
	R413	QRD161J-103	RESISTOR
	R414	QRD161J-472	RESISTOR
	R415	QRD161J-182	RESISTOR
	R416	QRD161J-105	RESISTOR
	R417	QRD161J-273	RESISTOR
	R418	QRD161J-185	RESISTOR
	R419	QRD161J-105	RESISTOR
	R420	QRD161J-273	RESISTOR
	R421	QRD161J-393	RESISTOR
	R422	QRD161J-475	RESISTOR
	R423	QRD161J-334	RESISTOR
	R424	QRD161J-222	RESISTOR
	R427	QRD161J-102	RESISTOR
	R428	QRD161J-104	RESISTOR
	R429	QRD161J-104	RESISTOR
	R430	QVZ3518-684	V RESISTOR, PB SW POINT
	R432	QRD161J-332	RESISTOR
	R434	QVZ3521-474	V RESISTOR, V LOCK
	R442	QRD161J-682	RESISTOR
	R443	QRD161J-102	RESISTOR
	R444	QRD161J-102	RESISTOR
	R445	QRD161J-184	RESISTOR
	R447	QRD161J-184	RESISTOR
	R448	QRD161J-274	RESISTOR
	R453	QRD161J-471	RESISTOR
	C401	QCBB1HJ-102	CAPACITOR
	C402	QETC1AM-226	E CAPACITOR
	C403	QETC1AM-226	E CAPACITOR
	C404	QCSB1HJ-150	CAPACITOR
	C405	QCBB1HJ-102	CAPACITOR
	C406	QETC1HM-105	E CAPACITOR
	C407	QCBB1HJ-102	CAPACITOR
	C408	QFV71HJ-153	M CAPACITOR
	C409	QCBB1HJ-561	CAPACITOR
	C410	QCBB1HJ-102	CAPACITOR
	C411	QETC1HM-105	E CAPACITOR
	C412	QETC1AM-226	E CAPACITOR
	C415	QCC31CK-122	CAPACITOR
	C416	QETC1EM-475	E CAPACITOR
	C417	QETC1EM-475	E CAPACITOR
	C418	QETC1CM-106	E CAPACITOR
	C419	QETC1CM-106	E CAPACITOR
	C420	QFV71HJ-334	M CAPACITOR
	C421	QFV71HJ-333	M CAPACITOR
	C422	QCBB1HJ-471	CAPACITOR
	C423	QFN31HJ-682	M CAPACITOR
	C424	QCBB1HJ-102	CAPACITOR
	C425	QFV71HJ-334	M CAPACITOR
	C426	QCBB1HJ-102	CAPACITOR
	C433	QCBB1HJ-102	CAPACITOR
	TP401	PU57545	T.PIN, X7(401-403/411/425/V
	CN402	PU58844-4	CAP HOUSING

-MECHACON SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	IC601	M50731-623SP	IC
	OR	M50731-626SP	IC
	OR	M50965E-305SP	IC
	IC602	BA6259N	IC
	IC603	M54647L	IC
	IC604	BA6222	IC
	Q601	2SC3311A(RS)	TRANSISTOR
	D601	MA165	DIODE
	OR	1SS133	DIODE
	D602	MA165	DIODE
	OR	1SS133	DIODE
	D603	HZS4.3EB2	ZENER DIODE
	D604	HZS7.5EB2	ZENER DIODE
	D605	MA165	DIODE
	OR	1SS133	DIODE
	D606	1SS133	DIODE
	OR	MA165	DIODE
	D607	HZS7.5EB2	ZENER DIODE
	R601	QRD161J-152	RESISTOR
	R602	QRD161J-103	RESISTOR
	R603	QRD161J-103	RESISTOR
	R604	QRD161J-122	RESISTOR
	R605	QRD161J-823	RESISTOR

# ⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R606	QRD161J-102	RESISTOR
	R607	QRD161J-102	RESISTOR
	R608	QRD161J-102	RESISTOR
	R609	QRD161J-472	RESISTOR
	R610	QRD161J-103	RESISTOR
	R611	QRD161J-105	RESISTOR
	R614	QRD161J-472	RESISTOR
	R615	QRD161J-472	RESISTOR
	R616	QRD161J-472	RESISTOR
	R617	QRD161J-472	RESISTOR
	R618	QRD161J-472	RESISTOR
	R619	QRD161J-472	RESISTOR
	R620	QRD161J-472	RESISTOR
	R621	QRD161J-472	RESISTOR
	R622	QRD161J-472	RESISTOR
	R623	QRD161J-472	RESISTOR
	R624	QRD161J-472	RESISTOR
	R625	QRD161J-472	RESISTOR
	R626	QRD161J-472	RESISTOR
	R627	QRD161J-472	RESISTOR
	R628	QRD161J-124	RESISTOR
	R629	QRD161J-124	RESISTOR
	R630	QRD161J-333	RESISTOR
	R631	QRD161J-472	RESISTOR
	R632	QRD161J-332	RESISTOR
	R634	QRD161J-103	RESISTOR
	R635	QRD161J-331	RESISTOR
	R636	QRD161J-822	RESISTOR
	R640	QRD161J-124	RESISTOR
	R641	QRD161J-124	RESISTOR
	R642	QRD161J-124	RESISTOR
	R644	QRD161J-124	RESISTOR
	R648	QRD161J-153	RESISTOR
	R649	QRD181J-271	RESISTOR
	RA602	QRB049J-103	RESISTOR ARRAY
	OR	QRB047J-103	RESISTOR ARRAY
	RA603	QRB049J-472	RESISTOR ARRAY
	OR	QRB047J-472	RESISTOR NETWORK
	C601	QCFB1EZ-223	CAPACITOR
	C602	QCFB1EZ-223	CAPACITOR
	C604	QETC1EM-335	E CAPACITOR
	C605	QETC1EM-475	E CAPACITOR
	C606	QETC1EM-475	E CAPACITOR
	C607	QETC1EM-475	E CAPACITOR
	C608	QETC1HM-105	E CAPACITOR
	C613	QCC11EK-473	CAPACITOR
	C614	QCF31HP-223	CAPACITOR
	L601	PU59152-100J	PEAKING COIL
	L602	PU59152-2R7J	PEAKING COIL
⚠	CF601	PU60030	RESONATOR
⚠	OR	PU60125	RESONATOR
	HS601	PU60158	HEAT SINK (IC603)
	SCW601	SBSE3006Z	TAPPING SCREW (IC603), X2
	SCW602	SBSE3008Z	TAPPING SCREW (IC603)
	CN601	PU59934-15	WIRE HOLDER
	CN603	PU59555-6	CAP HOUSING
	CN604	PU59555-6	CAP HOUSING
	CN605	PU59555-8	CAP HOUSING
	CN606	PU58844-4	CAP HOUSING
⚠	CP602	ICP-F25	CIRCUIT PROTECTOR

# ⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
		-REGULATOR SECTION-	
	IC801	STK5481	IC
	D801	MA165	DIODE
	OR	1SS133	DIODE
	R801	QRD161J-682	RESISTOR
	R802	QRD161J-272	RESISTOR
	R803	QRD161J-223	RESISTOR
	C801	QETC1CM-476	E CAPACITOR
	C802	QETC1CM-107	E CAPACITOR
	C803	QETC1CM-476	E CAPACITOR
	C804	QETC0JM-476	E CAPACITOR
	C805	QETC1EM-106	E CAPACITOR
	C901	QCBB1HK-102	CAPACITOR
	L901	PU59152-100J	INDUCTOR
	SCW1	SDSB3014Z	TAPPING SCREW, X2
	SCW2	SDSB3010Z	SCREW, X2
	WR2	PW30401-AB22T	COAXIAL CORD
⚠	HS801	PQ31691	HEAT SINK (IC801)
	WR601	PW30112-M0AF6AF	PARALLEL WIRE (CN601)
	TP801	PU57545	TEST PIN, X3(801-803)

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IF BOARD ASSEMBLY <07>

REF NO.		PART NO.	PART NAME, DESCRIPTION
PWBA		PB10007V	IF BOARD ASSEMBLY
IC1		M51496P	IC
Q1		2SC2636T	TRANSISTOR
Q2		2SD1450S,T	TRANSISTOR
	OR	2SD1468S(RSE)	TRANSISTOR
Q3		2SC3399	TRANSISTOR
	OR	UN4213	TRANSISTOR
	OR	DTC144ES	TRANSISTOR
Q4		2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
Q5		2SA933S(RS)	TRANSISTOR
	OR	2SA1309AR,S	TRANSISTOR
Q6		2SC536SPA(FG)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
Q7		2SA933S(RS)	TRANSISTOR
	OR	2SA1309AR,S	TRANSISTOR
Q8		2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
Q9		2SD1450S,T	TRANSISTOR
	OR	2SD1468S(RSE)	TRANSISTOR
Q10		2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
Q11		2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311A(RS)	TRANSISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
		OR 2SC1740S(RS)	TRANSISTOR
	Q14	2SC3399	TRANSISTOR
		OR DTC144ES	TRANSISTOR
		OR UN4213	TRANSISTOR
	Q15	2SC1740S(RS)	TRANSISTOR
		OR 2SC3311A(RS)	TRANSISTOR
	D1	MTZ11B	ZENER DIODE
		OR UZ11BSB	ZENER DIODE
		OR RD11ES-T1B2	ZENER DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D10	1SS133	DIODE
	R2	NRD718J-750NBU	RESISTOR
	R6	NRD718J-822NBU	RESISTOR
	R7	NRD718J-472NBU	RESISTOR
	R8	NRD718J-220NBU	RESISTOR
	R9	NRD718J-271NBU	RESISTOR
	R10	NRD718J-240NBU	RESISTOR
	R11	NRD718J-102NBU	RESISTOR
	R17	NRD718J-472NBU	RESISTOR
	R18	QVZ3518-102	V RESISTOR,RF AGC
	R19	NRD718J-102NBU	RESISTOR
	R22	NRD718J-103NBU	RESISTOR
	R23	NRD718J-472NBU	RESISTOR
	R24	NRD718J-103NBU	RESISTOR
	R25	NRD718J-103NBU	RESISTOR
	R28	NRD718J-103NBU	RESISTOR
	R29	NRD718J-102NBU	RESISTOR
	R30	NRD718J-334NBU	RESISTOR
	R31	NRD718J-334NBU	RESISTOR
	R32	NRD718J-272NBU	RESISTOR
	R34	NRD718J-561NBU	RESISTOR
	R35	NRD718J-331NBU	RESISTOR
	R36	NRD718J-102NBU	RESISTOR
	R37	NRD718J-271NBU	RESISTOR
	R39	NRD718J-153NBU	RESISTOR
	R42	NRD718J-152NBU	RESISTOR
	R43	QVZ3518-103	V RESISTOR,COLOR LEVEL
	R44	NRD718J-102NBU	RESISTOR
	R45	NRD718J-102NBU	RESISTOR
	R47	NRD718J-471NBU	RESISTOR
	R49	NRD718J-102NBU	RESISTOR
	R51	NRD718J-331NBU	RESISTOR
	R52	QVZ3518-471	V RESISTOR ,VPS LEVEL
	R53	NRD718J-102NBU	RESISTOR
	R56	NRD718J-222NBU	RESISTOR
	R61	NRD718J-471NBU	RESISTOR
	R62	NRD718J-104NBU	RESISTOR
	R63	NRD718J-223NBU	RESISTOR
	R64	NRD718J-392NBU	RESISTOR
	R65	NRD718J-103NBU	RESISTOR
	R66	NRD718J-471NBU	RESISTOR
	R67	NRD718J-223NBU	RESISTOR
	R68	NRD718J-223NBU	RESISTOR
	R69	NRD718J-103NBU	RESISTOR
	R90	NRD718J-274NBU	RESISTOR
	R91	NRD718J-473NBU	RESISTOR
	R92	NRD718J-473NBU	RESISTOR
	C5	NCX71CM-222NBR	CAPACITOR
	C6	NCX71CM-222NBR	CAPACITOR
	C7	NCX71CM-222NBR	CAPACITOR
	C8	NCX71CM-222NBR	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C11	PU57601-224MEZ	E CAPACITOR
	C12	NCY71CM-103NBR	CAPACITOR
	C13	QEK61CM-476	E CAPACITOR
	C14	NCX71CM-222NBR	CAPACITOR
	C17	QEK61CM-106	E CAPACITOR
	C18	NCY71CM-103NBR	CAPACITOR
	C19	QFL31HJ-182	M CAPACITOR
	C21	NCS71HJ-330NBR	CAPACITOR
	C22	NCB71HK-101NBR	CAPACITOR
	C25	QCT25CH-270	CAPACITOR
	C32	NCS71HJ-470NBR	CAPACITOR
	C36	QEK61CM-336	E CAPACITOR
	C41	QEK61CM-226	E CAPACITOR
	C42	QEK61CM-336	E CAPACITOR
	C43	NCF71EZ-223NBR	CAPACITOR
	C44	QEK61HM-474	E CAPACITOR
	C70	QEK61CM-226	E CAPACITOR
	L2	PU60025-1R1	PEAKING COIL
	L3	PU60025-1R5	PEAKING COIL
	L5	PU59152-150J	PEAKING COIL
	L7	PU59152-220J	PEAKING COIL
	CF2	PU58558-2	CERAMIC FILTER
	CF4	PU32990-2	CERAMIC FILTER
	SAW1	PU35557-7	SAW FILTER
	T1	PU59982-2	IF.TRANSFORMER, LLD
	T2	PU59983-2	IF.TRANSFORMER, AFC
	T3	PU60046	IF.TRANSFORMER, SYNC
	T4	PU60176-2	IF.TRANSFORMER, S.TRAP
	TML1	PU59935-16	TERMINAL

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* TUNER CONTROL BOARD ASSEMBLY <08> *

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#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB20168M	TUNER CONTROL BOARD ASSEMBLY
	TNR1	PU36384-1-1	U/V TUNER
	IC1	LA7910	IC
	IC2	AN1358	IC
		OR M5223P	IC
	IC3	BU4066B	IC
		OR TC4066BP	IC
	Q1	2SB810H,J	TRANSISTOR
	Q2	DTC144ES	TRANSISTOR
		OR UN4213	TRANSISTOR
		OR 2SC3399	TRANSISTOR
	Q6	2SC1740S(S)	TRANSISTOR
		OR 2SC3311A(S)	TRANSISTOR
		OR 2SC536SPA(FG)	TRANSISTOR
	Q8	2SC1740S(S)	TRANSISTOR
		OR 2SC536SPA(FG)	TRANSISTOR
		OR 2SC3311A(S)	TRANSISTOR
	Q12	2SC1740S(S)	TRANSISTOR
		OR 2SC3311A(S)	TRANSISTOR
		OR 2SC536SPA(FG)	TRANSISTOR
	D2	HZT33-02	ZENER DIODE
	D3	1SS133	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D4	MTZ5.1B	ZENER DIODE
		OR RD5.1ES-T1B2	ZENER DIODE
	D5	MTZ5.1B	ZENER DIODE
		OR RD5.1ES-T1B2	ZENER DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	D8	1SS133	DIODE
	R1	QRD161J-182	RESISTOR
	R2	QRD161J-153	RESISTOR
	R5	QRG028J-152A	RESISTOR
	R6	QRD161J-821	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-333	RESISTOR
	R13	QRD161J-331	RESISTOR
	R14	QRD161J-394	RESISTOR
	R15	QRD161J-154	RESISTOR
	R16	QRD161J-154	RESISTOR
	R17	QRD161J-154	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-103	RESISTOR
	R20	QRD161J-393	RESISTOR
	R25	QRD161J-472	RESISTOR
	R26	QRD161J-472	RESISTOR
	R27	QRD161J-104	RESISTOR
	R28	QRD161J-472	RESISTOR
	R29	QRD161J-472	RESISTOR
	R33	QRD161J-274	RESISTOR
	R35	QRD161J-472	RESISTOR
	R36	QRD161J-472	RESISTOR
	R37	QRD161J-123	RESISTOR
	R38	QRD161J-123	RESISTOR
	R40	QRD161J-333	RESISTOR
	R41	QRD161J-333	RESISTOR
	R42	QRD161J-103	RESISTOR
	R43	QRD162J-684	RESISTOR
	R44	QRD161J-563	RESISTOR
	R45	QRD161J-472	RESISTOR
	R46	QRD161J-473	RESISTOR
	R47	QRD161J-103	RESISTOR
	R48	QRD161J-103	RESISTOR
	R49	QRD161J-224	RESISTOR
	R50	QRD161J-334	RESISTOR
	R51	QRD161J-824	RESISTOR
	R52	QRD161J-154	RESISTOR
	R53	QRD161J-393	RESISTOR
	R54	QRD161J-334	RESISTOR
	R69	QRD161J-103	RESISTOR
	R70	QRD161J-103	RESISTOR
	R71	QRD161J-103	RESISTOR
	C2	QETC1CM-106	E CAPACITOR
	C3	QETC1HM-476	E CAPACITOR
	C5	QETC1HM-106	E CAPACITOR
	C7	QCVB1CM-103	CAPACITOR
	C8	QFV71HJ-333	M CAPACITOR
	C9	QFV71HJ-153	M CAPACITOR
	C10	QFV71HJ-333	M CAPACITOR
	C11	QFV71HJ-153	M CAPACITOR
	C15	QETC1CM-106	E CAPACITOR
	C16	QETC1HM-225	E CAPACITOR
	C17	QETC1CM-106	E CAPACITOR
	C18	QETC1HM-225	E CAPACITOR
	C19	QETC1CM-106	E CAPACITOR
	C20	QETC1CM-106	E CAPACITOR
	C21	QETC1CM-106	E CAPACITOR
	C25	QCSB1HJ-100	CAPACITOR
	C27	QCVB1CM-103	CAPACITOR
	L1	PU59152-R22M	PEAKING COIL
	L2	PU59152-1R0K	PEAKING COIL
	L4	PU59152-6R8K	PEAKING COIL
⚠	TH1	PU52108-4R7K	POSITIVE THERMISTOR
⚠		OR PU52108-4R7T	POSISTOR
⚠		OR PU52108-4R7KT	POSISTOR
⚠		OR PU52108-4R7	POSISTOR
	HD1	PU36416-1-3	HOLDER
	CN1	PU58844-8	CAP HOUSING
	CN2	PU59555-6	CAP HOUSING
	CN3	PU58844-3	CAP HOUSING
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR

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AUDIO/CTL HEAD BOARD <12>

PWB1	PU58016	A/C HEAD BOARD
BKT1	PQ43014	BRACKET
SCW1	SPSH1740	MINI SCREW
CN1	PU54537-5	CAP HOUSING
CN2	PU54537-2B	CAP HOUSING

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VPS BOARD ASSEMBLY (EG ONLY) <18>

PWBA	PU36174B-03	VPS.BOARD ASSEMBLY
IC1	HD49703NT	IC
IC2	M5278L05	IC
Q1	2SB641R,S	TRANSISTOR
Q2	2SC3327A	TRANSISTOR
	OR 2SC2878A	TRANSISTOR
Q3	2SD637R,S	TRANSISTOR
D1	1SS133	DIODE, X5, D1-D5
R1	QRD161J-103	RESISTOR
R2	QRD161J-103	RESISTOR
R3	QRD161J-102	RESISTOR
R4	QRD161J-102	RESISTOR
R5	QRD161J-102	RESISTOR
R6	QRD161J-473	RESISTOR
R7	QRD161J-103	RESISTOR
R8	QRD161J-391	RESISTOR
R9	QRD161J-562	RESISTOR
R10	QRD161J-102	RESISTOR
R11	QRD161J-473	RESISTOR
R12	QRD161J-562	RESISTOR
R13	QRD161J-105	RESISTOR
R14	QRD161J-472	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R15	QRD161J-472	RESISTOR
	R16	QRD161J-472	RESISTOR
	R17	QRD161J-472	RESISTOR
	R18	QRD161J-562	RESISTOR
	R19	QRD161J-563	RESISTOR
	R20	QRD161J-222	RESISTOR
	R21	QRD161J-222	RESISTOR
	R22	QRD161J-222	RESISTOR
	R23	QRD161J-222	RESISTOR
	R24	QRD161J-472	RESISTOR
	R25	QRD161J-682	RESISTOR
	R26	QRD161J-472	RESISTOR
	R27	QRD161J-102	RESISTOR
	R28	QRD161J-103	RESISTOR
	R29	QRD161J-103	RESISTOR
	R30	QRD161J-184	RESISTOR
	R31	QRD161J-103	RESISTOR
	R32	QRD161J-332	RESISTOR
	R33	QRD161J-561	RESISTOR
	R34	QRD161J-474	RESISTOR
	R35	QRD161J-474	RESISTOR
	R36	QRD161J-332	RESISTOR
	R37	QRD161J-103	RESISTOR
	RA1	QRB049J-224C	RESISTOR ARRAY
	C1	QETC1CM-336	E CAPACITOR
	C2	QCS31HJ-681	CAPACITOR
	C3	QETC1CM-106	E CAPACITOR
	C4	QCS31HJ-391	CAPACITOR
	C5	QCT25CH-390	CAPACITOR
	C6	QFN31HJ-103	M CAPACITOR
	C7	QFN31HJ-102	M CAPACITOR
	C8	QFN31HJ-102	M CAPACITOR
	C9	QETC1CM-336	E CAPACITOR
	C10	QETC1CM-336	E CAPACITOR
	C11	QCF31HP-473	CAPACITOR
	C12	QETC1CM-336	E CAPACITOR
	C13	QETC1CM-336	E CAPACITOR
	C14	QETC1CM-336	E CAPACITOR
	C15	QCS31HJ-391	CAPACITOR
	C16	QETC1HM-335	E CAPACITOR
	C17	QETC1HM-105	E CAPACITOR
	C18	QETC1HM-106	E CAPACITOR
	C19	QCT25CH-390	CAPACITOR
	C20	QCT25CH-150	CAPACITOR
	C21	QETC1CM-336	E CAPACITOR
	C22	QCT25CH-100	CAPACITOR
	T1	PU58484	COIL
	SPC1	PU59210-003	W.LOKING SPACER, X3
	CN1	PU58844-4	CAP HOUSING
	CN2	PU58844-3	CAP HOUSING
	TP	PU56008	TEST PIN (TP1 - TP6)

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TIMER/DISPLAY BOARD ASSEMBLY <21>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB20203A-01	TIMER/DISP BOARD ASSY, EG
		PB20203C-01	TIMER/DISP BOARD ASSY, E
	IC1	UPD75216ACW-099	IC
	IC2	M5278L56	IC
	IC3	IC-PST523H-2	IC
	Q1	DTC144WS	TRANSISTOR
		OR 2SC3401	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS132	DIODE
	D5	1SS132	DIODE
	D6	1SS132	DIODE
	D7	1SS132	DIODE
	D8	1SS132	DIODE
	D9	1SS132	DIODE
	D10	1SS132	DIODE
	D16	RD10ES-T1B2	ZENER DIODE
		OR UZ10BSB	ZENER DIODE
	D17	1SS133	DIODE
	D18	MA27TB	DIODE
	D202	SLR-34VC3F	LE DIODE, REC
	R2	QRD161J-224	RESISTOR
	R3	QRD161J-333	RESISTOR
	R4	QRD161J-102	RESISTOR
	R5	QRD161J-333	RESISTOR
	R6	QRD161J-273	RESISTOR
	R7	QRD161J-472	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-103	RESISTOR
	R14	QRD161J-103	RESISTOR
	R15	QRD161J-103	RESISTOR
	R16	QRD161J-103	RESISTOR
	R17	QRD161J-103	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-103	RESISTOR
	R20	QRD161J-103	RESISTOR
	R22	QRD161J-102	RESISTOR
	R25	QRD161J-103	RESISTOR
	R26	QRD161J-103	RESISTOR
	R27	QRD161J-103	RESISTOR
	R28	QRD161J-103	RESISTOR
	R29	QRD161J-103	RESISTOR
	R30	QRD161J-103	RESISTOR
	R31	QRD161J-472	RESISTOR
	R32	QRD161J-472	RESISTOR
	R33	QRD161J-472	RESISTOR
	R34	QRD161J-472	RESISTOR
	R35	QRD161J-333	RESISTOR
	R36	QRD161J-333	RESISTOR
	R38	QRD161J-102	RESISTOR
	R39	QRD161J-333	RESISTOR
	R202	QRD161J-331	RESISTOR
	RA1	QRB057J-104	RESISTOR ARRAY
	RA2	QRB047J-224	RESISTOR NETWORK
	RA3	QRB087J-224	RESISTOR NETWORK
	C1	QEK61CM-336	E CAPACITOR
	C2	QEK60JM-336	E CAPACITOR
	C3	QEA40HZ-104	E CAPACITOR (DOUBLE)
	C6	QCVB1CN-103	CAPACITOR
	C7	QCVB1CN-103	CAPACITOR
	C8	QCC11EK-223	CAPACITOR
	C9	QCVB1CN-103	CAPACITOR
	C10	QEK61CM-106	E CAPACITOR
	C14	QEK60JM-336	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C15	QCSB1HJ-470	CAPACITOR
	C50	QCC11EK-223	CAPACITOR
	C101	QCC11EJ-473R	CAPACITOR
⚠	CF1	PU59545	RESONATOR
	S1	PU59447	TACT SWITCH
	S2	PU59447	TACT SWITCH
	S3	PU59447	TACT SWITCH
	S4	PU59447	TACT SWITCH
	S5	PU59447	TACT SWITCH
	S6	PU59447	TACT SWITCH
	S7	PU59447	TACT SWITCH
	S8	PU59447	TACT SWITCH
	S9	PU59447	TACT SWITCH
	S10	PU57551	TACT SWITCH, CH DOWN
	S12	PU59447	TACT SWITCH
	S13	PU59447	TACT SWITCH
	S14	PU57551	TACT SWITCH, CH UP
	S15	PU57551	TACT SWITCH
	S210	PU59447	TACT SWITCH
	S211	PU59447	TACT SWITCH
	S402	PU60260	SLIDE SWITCH
	S403	PU58344	SLIDE SWITCH
	FDP1	PU59951-6	FLUORESCENT DISPLAY PANEL,E
		PU59951-7	FLUORESCENT DISPLAY PANEL,EG
	CL1	PU56729-2	WIRE CLAMP, X2
	HD1	PQ32005	HOLDER(L) (FDP)
	HD2	PQ32006	HOLDER(R) (FDP)
	HD201	PQM30038-1-2	LED HOLDER (D202)
	TP1	PU56008	TEST PIN
	CN5	PU60169-7	HOUSING

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OPERETION BOARD ASSEMBLY <22>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB20195A	OPERATION BOARD ASSY
	IC201	GP1U501	INFRARED RAYS UNIT
	D200	MTZ5.1B	ZENER DIODE
	D201	SLR-34VC3F	LE DIODE
	D203	SLR-34VC3F	LE DIODE
	D204	SLR-34MC3F	LE DIODE
	R200	QRD161J-102	RESISTOR
	R203	QRD161J-331	RESISTOR
	R204	QRD161J-331	RESISTOR
	R211	QRD161J-222	RESISTOR
	R212	QRD161J-222	RESISTOR
	R213	QRD161J-332	RESISTOR
	R214	QRD161J-472	RESISTOR
	R215	QRD161J-103	RESISTOR
	R216	QRD161J-222	RESISTOR
	R217	QRD161J-222	RESISTOR
	R218	QRD161J-183	RESISTOR
	R219	QRD161J-223	RESISTOR
	R220	QRD161J-563	RESISTOR
	R221	QRD161J-471	RESISTOR
	S201	PU57551	TACT SWITCH
	S203	PU57551	TACT SWITCH
	S204	PU57551	TACT SWITCH
	S205	PU57551	TACT SWITCH
	S206	PU57551	TACT SWITCH
	S207	PU57551	TACT SWITCH
	S208	PU57551	TACT SWITCH
	CL201	PU56729-2	WIRE CLAMP
	HD201	PQ43191	LED HOLDER
	HD202	PQ40795-4-2	LED HOLDER
	HD203	PQ40795-4-2	LED HOLDER
	CN203	PU59513-2	CAP HOUSING

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MEMORY BOARD ASSEMBLY <35>

REF NO.	PART NO.	PART NAME, DESCRIPTION
PWBA	PB20168M2	MEMORY BOARD ASSY.
IC101	MN1220	IC
R101	QRD161J-104	RESISTOR
R102	QRD161J-104	RESISTOR
R103	QRD161J-104	RESISTOR
CN101	PU60168-7	CAP HOUSING

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UPPER DRUM BOARD <41>

REF NO.	PART NO.	PART NAME, DESCRIPTION
PWB1	PDM3017	UPPER DRUM BOARD

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PRE/REC BOARD ASSEMBLY <43>

REF NO.	PART NO.	PART NAME, DESCRIPTION
PWBA	PU36328B-01	PRE/REC BOARD ASSEMBLY
IC1	AN3380K	IC
	OR AN3380NK	IC
Q1	2SA1309R,S	TRANSISTOR
Q2	2SC1740S(RS)	TRANSISTOR
Q3	2SC1740S(RS)	TRANSISTOR
Q4	DTC144WS	TRANSISTOR
Q6	2SC1740S(RS)	TRANSISTOR
D2	1SS133	DIODE
	OR MA165	DIODE
D3	1SS133	DIODE
	OR MA165	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R1	QRD161J-102	RESISTOR
	R2	QRD161J-222	RESISTOR
	R3	QRD161J-222	RESISTOR
	R4	QRD161J-391	RESISTOR
	R5	QRD161J-821	RESISTOR
	R6	QRD161J-391	RESISTOR
	R7	QRD161J-222	RESISTOR
	R8	QRD161J-222	RESISTOR
	R9	QRD161J-102	RESISTOR
	R10	QRD161J-122	RESISTOR
	R11	QRD161J-821	RESISTOR
	R12	QRD161J-331	RESISTOR
	R15	QRD161J-122	RESISTOR
	R16	QRD161J-153	RESISTOR
	R17	QRD161J-103	RESISTOR
	R18	QRD161J-222	RESISTOR
	R19	QRD161J-222	RESISTOR
	R20	QRD161J-332	RESISTOR
	R21	QRD161J-561	RESISTOR
	R22	QRD161J-391	RESISTOR
	R23	QRD161J-181	RESISTOR
	R24	QRD161J-151	RESISTOR
	R25	QRV144F-4122AY	CMF RESISTOR
	R26	QRD161J-562	RESISTOR
	R27	QRD161J-333	RESISTOR
	C1	QETC0JM-476	E CAPACITOR
	C2	QCVB1CN-103	CAPACITOR
	C3	QCVB1CN-103	CAPACITOR
	C5	QCVB1CN-103	CAPACITOR
	C6	QCSB1HJ-270	CAPACITOR
	C7	QCSB1HJ-560	CAPACITOR
	C9	QCSB1HJ-270	CAPACITOR
	C10	QCVB1CN-103	CAPACITOR
	C11	QCVB1CN-103	CAPACITOR
	C12	QCVB1CN-103	CAPACITOR
	C13	QFV41HJ-104	TF CAPACITOR
	C15	QEE41AM-335	TANTAL CAPACITOR
	C17	QCSB1HJ-680	CAPACITOR
	C18	QCVB1CN-103	CAPACITOR
	C19	QFV41HJ-104	M CAPACITOR
	C20	QER61CM-106	E CAPACITOR
	C21	QCBB1HJ-820	CAPACITOR
	C22	QCBB1HJ-820	CAPACITOR
	C23	QER61CM-106	E CAPACITOR
	C24	QCVB1CN-103	CAPACITOR
	C25	QEE40JM-685	E CAPACITOR
	C26	QETC0JM-476	E CAPACITOR
	C27	QCBB1HJ-121	CAPACITOR
	C29	QCSB1HK-4R7	CAPACITOR
	C31	QCVB1CN-103	CAPACITOR
	L1	PU48530-101K	PEAKING COIL
	L3	PU59152-560J	PEAKING COIL
	L4	PU59152-470J	PEAKING COIL
	L6	PU59152-330J	PEAKING COIL
	L7	PU48530-101K	PEAKING COIL
	L8	PU59152-680J	PEAKING COIL
	L9	PU59152-100J	PEAKING COIL
	L10	PU59152-8R2J	PEAKING COIL
	L11	PU59152-150J	PEAKING COIL
	BKT1	PQ42955	BOARD BRACKET, FOR PRE/REC
	ETH1	PQ40433-2	EARTH LUG
	SCW1	DPSP2606Z	SCREW, X3
	SLD1	PQ42959	SHIELD CASE
	SLD2	PQ42960	SHIELD PLATE
	SLD3	PQ42961	SHIELD COVER
	SPC1	WBS2600Z	T.L.WASHER
	CN1	PU58844-8	CAP HOUSING
	CN2	PU58844-6	CAP HOUSING
	CN3	PU56258-4	CAP HOUSING

SECAM DETECTOR BOARD ASSEMBLY <44>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB30005A-01	SECAM DETECTOR BOARD ASSEMBLY
	IC251	BA7007	IC
	Q251	2SC1740S(RS)	TRANSISTOR
	R251	QRD161J-103	RESISTOR
	R252	QRD161J-562	RESISTOR
	R253	QRD161J-333	RESISTOR
	R254	QRD161J-183	RESISTOR
	R255	QRD161J-102	RESISTOR
	R256	QRD161J-393	RESISTOR
	R257	QVZ3521-472	V RESISTOR, SECAM DET
	R258	QRD161J-563	RESISTOR
	R259	QRD161J-182	RESISTOR
	R260	QRD161J-154	RESISTOR
	R261	QRD161J-332	RESISTOR
	C251	QFN31HJ-562	M CAPACITOR
	C252	QCVB1CN-103	CAPACITOR
	C253	QETC1CM-106	E CAPACITOR
	C254	QFN31HJ-223	M CAPACITOR
	C255	QER61CM-476	E CAPACITOR
	C256	QCVB1CN-103	CAPACITOR
	C257	QETC1AM-336	E CAPACITOR
	C258	QFN31HJ-122	M CAPACITOR
	L251	PU49057	LC BLOCK
	L252	PU59153-562J	PEAKING COIL
	L253	PU48530-101K	PEAKING COIL
	CF251	PU56983	CERAMIC FILTER
	TML1	PU60330-110	TERMINAL
	TP251	PU57545	TEST PIN

DECK TERMINAL BOARD ASSEMBLY <51><53>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PU22509C-01	DECK TERMINAL BOARD ASSY

-DECK TERMINAL BOARD SECTION <51>-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA1	PU22509A1-01	DECK TERMINAL BOARD ASSY
	R1	QRD181J-151	RESISTOR
	R3	QRD181J-331	RESISTOR
	PHS1	PU60271	PHOTO INTERRUPTER

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	WR1	PW30110-26DD885	PRLL WIRE (J1), NOT INCLUDED
	CN1	PU59933-15	WIRE TRAP

-REC SAFETY BOARD SECTION <53>-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA3	PU22509A3	REC SAFETY BOARD ASSY
	S1	PU58644-1-3	REC SAFETY SWITCH

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RELAY BOARD ASSEMBLY <52>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA2	PU22509C2	RELAY BOARD ASSY
	LC1	PU59809-222T	N FILTER
	LC2	PU59809-222T	N FILTER
	WR1	PW30113-G0ABZ62	PARALLEL WIRE

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END SENSOR BOARD ASSEMBLY <54>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA4	PU22509A4	END SENSOR BOARD ASSY
	Q1	PN268R-NC	PHOTO TRANSISTOR
	HD1	PQ31047	E.SENSOR HOLDER
	CN1	PU59945-102	WIRE SOCKET

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CASSETTE HOUSING BOARD <56>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWB1	PB30043	CASSETTE HOUSING BOARD
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	RESISTOR
	PHS1	PU58879	PHOTO INTERRUPTER
	CN1	PU58844-106	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	WR1	PW30110-26DD885	PRLL WIRE (J1), NOT INCLUDED
	CN1	PU59933-15	WIRE TRAP

-REC SAFETY BOARD SECTION <53>-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA3	PU22509A3	REC SAFETY BOARD ASSY
	S1	PU58644-1-3	REC SAFETY SWITCH

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RELAY BOARD ASSEMBLY <52>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA2	PU22509C2	RELAY BOARD ASSY
	LC1	PU59809-222T	N FILTER
	LC2	PU59809-222T	N FILTER
	WR1	PW30113-G0ABZ62	PARALLEL WIRE

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END SENSOR BOARD ASSEMBLY <54>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA4	PU22509A4	END SENSOR BOARD ASSY
	Q1	PN268R-NC	PHOTO TRANSISTOR
	HD1	PQ31047	E.SENSOR HOLDER
	CN1	PU59945-102	WIRE SOCKET

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CASSETTE HOUSING BOARD <56>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWB1	PB30043	CASSETTE HOUSING BOARD
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	RESISTOR
	PHS1	PU58879	PHOTO INTERRUPTER
	CN1	PU58844-106	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	WR1	PW30110-26DD885	PRLL WIRE (J1), NOT INCLUDED
	CN1	PU59933-15	WIRE TRAP
			-REC SAFETY BOARD SECTION <53>-
	PWBA3	PU22509A3	REC SAFETY BOARD ASSY
	S1	PU58644-1-3	REC SAFETY SWITCH

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RELAY BOARD ASSEMBLY <52>

REF NO.	PART NO.	PART NAME, DESCRIPTION
PWBA2	PU22509C2	RELAY BOARD ASSY
LC1	PU59809-222T	N FILTER
LC2	PU59809-222T	N FILTER
WR1	PW30113-G0ABZ62	PARALLEL WIRE

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END SENSOR BOARD ASSEMBLY <54>

REF NO.	PART NO.	PART NAME, DESCRIPTION
PWBA4	PU22509A4	END SENSOR BOARD ASSY
Q1	PN268R-NC	PHOTO TRANSISTOR
HD1	PQ31047	E.SENSOR HOLDER
CN1	PU59945-102	WIRE SOCKET

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CASSETTE HOUSING BOARD <56>

REF NO.	PART NO.	PART NAME, DESCRIPTION
PWB1	PB30043	CASSETTE HOUSING BOARD
Q1	PN268R-NC	PHOTO TRANSISTOR
R1	QRD161J-471	RESISTOR
PHS1	PU58879	PHOTO INTERRUPTER
CN1	PU58844-106	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION